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BOSTON JOURNAL OF COMMERCE AND TEXTILE INDUSTRIES and SOUTHERN MILLS.

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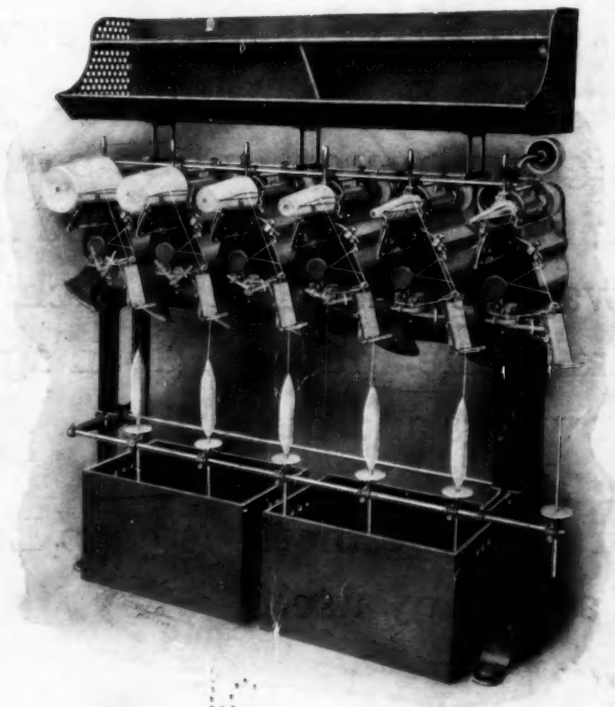

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CURTAILMENT.

The inexorable economic law of supply and demand relative to raw cotton and finished products has brought about a condition in the cotton branch of the textile industry that is giving a great deal of concern to those who are vitally interested in this great business of making thread and cloth from the fleecy staple, and calls for the most careful consideration and unity of action by the mills. That the condition is of national interest is shown daily by the attention devoted to it by the press all over the country.

The condition is a complicated one, owing to the fact that the price fluctuations of raw cotton are not in a fixed ratio to those of the finished materials. Witness the fact that in the fall of 1907 cotton was selling around 13 cents and the price of standard print cloth was 5 cents, whereas at the present time cotton is selling at 14½ cents and print cloth is not bringing 4 cents.

The fact is that the two commodities must be considered separately when explaining their prices as controlled by economic laws.

If cotton mills manufactured yarns and cloth on a commission basis without buying the staple outright, their position would be easy and they would have no other responsibility than to produce the highest quality and quantity of goods possible. But such a condition does not exist, and the manufacturer has to provide himself with raw material, having faith in his ability to dispose of his finished product at a figure that will cover the price of the cotton, the cost of manufacture and a reasonable profit. Naturally when a short crop of cotton looms up with an estimated yield of 11,500,000 bales and estimates show that with a normal operation of the cotton mills over 13,000,000 bales will be required, there is every reason why the price should soar, and so it has, aided to an extent by manipulation. But what of the finished product? Here are found different conditions. The late depression with its drastic readjustment of prices has made buyers extremely cautious and a hand to mouth business has been the order of the day for a long time. The result has been that the demand was not sufficiently urgent to warrant a return to previous prices of 1907 thus far, and hence the serious condition which the cotton mills are now facing.

The most natural solution of the problem and one calculated to put the mills in the safest possible position is that of a systematic curtailment. The movement has already gained a tremendous impetus and shows significant signs of being put into operation in a short time.

While such an expedient is necessary in order to hasten the proper readjustment of prices which will probably occur with the mill product, it is to be hoped that this enforced curtailment will not be required for any great length of time, both on account of the loss to the mills when not running at full capacity and on account of the loss in wages to the enormous army of operatives who will be effected by the order.

It is proposed by the Arkwright Club to make the curtailment 224 working hours between the time that the order goes into effect and August 1, 1910. The American Cotton Manufacturers' Association proposes that the mills shut down at least one day in each week, until the proper adjustment of prices is consummated. This would mean about a 15 per cent. reduction in the working hours, with its consequent effects through the mills and on production.

Granting that 60 per cent. of the 27,000,000 spindles in this country adopted the curtailment plan, it would mean a loss of 15 per cent. on the efficiency of an investment of $325,000,000; a decrease of 600,000 bales needed; and would effect about 200,000 operatives who would lose $16,000,000 in wages in a year. Such a systematic plan of curtailment would have a two-fold effect, namely, it would tend to lower the price of cotton to an extent, and would enable any surplus stock of finished goods to be worked off and pave the way for higher prices which are necessary in order for the mills to continue in full operation.

MORE COTTON NEEDED.

There seems to be a decided impression among some few people who are posing as ardent friends of the Southern farmer, that the cotton mills of the country are about to form an unholy alliance for the avowed purpose of ruining the farmers' prospects of obtaining fancy prices for their cotton, due to the exceptional shortage of the crop for 1909-1910.

The cotton mills' position in the matter is very plain, and the concerted movement looking to the solution of one of the most serious problems that ever confronted the industry is one of the many encouraging signs that shows how this enormous business is daily strengthening its position.

The cotton mills are not arrayed against the farmers, but on the contrary they are the Southern farmers best friends. The phenomenal expansion of the textile industry has made the price of cotton what it is to-day, and furthermore has given the farmers the safest assurance that their product will always find a ready market.

Curtailment yields no profit to a mill, except in a negative sense in that it partially prevents a loss that full operation of the plant would entail when the price of raw cotton is above the limit at which it can be profitably manufactured into yarn and cloth.

What the mills want is full time operation with cotton at a reasonable figure, and it is only by producing a sufficient quantity of cotton that real prosperity for the farmer and the mills can be expected. The most natural course, then, would be for the farmers to cultivate a larger acreage in future, and thus secure the ultimate yield against such a calamitous deterioration witnessed during the present season.

An examination of the following figures will show that there has been very little increase in acreage during the last six years, while the spindleage in America alone has increased about 4,000,000 spindles or over 16 per cent.

Season.	Acreage.
1904-05	31,730,000
1905-06	27,400,000
1906-07	32,049,000
1907-08	32,060,000
1908-09	33,370,000
1909-10	31,918,000

It will be seen that the acreage for 1909-10 is about 1,400,000 acres below the previous season, which fact coupled with the deterioration of the crop has caused such a scarcity of cotton.

The United States is pre-eminently the cotton grower of the world, both as to quantity and quality, but the fact must not be lost sight of that other cotton growing sections of the world are making every effort to increase production. This cotton can be used very successfully in England and on the Continent, and will be taken in preference to abnormally high priced cotton from America.

The Southern farmer can grow cotton at 8 cents per pound and every inducement seems to be offered for him to increase the acreage to yield a sufficient amount to meet the requirements of the textile industry. The mills will pay a reasonable price for cotton, and with a full sized crop, both farmers and mills can enjoy a share of prosperity that rightly belongs to them.

FANCY LOOMS IN THE SOUTH.

The many automatic attachments to plain looms in recent years have made plain weaving a comparatively simple duty. Green hands are taken into the mills and in a few days are sufficiently schooled in the operation of the automatic looms to take charge of a stand, that would in previous years have taken months. The obvious reason is that the careful oversight once required of the weaver in detecting broken threads, and watching for the filling in the shuttles to be exhausted, is now taken care of automatically.

While this is true to a certain extent in fancy weaving, yet a weaver on these looms must have a good deal more experience than for plain work, and must be suited to the work if he would be successful. The requirements of a fancy weaver are many and to acquire the proper qualifications, he should as a preliminary step, start in as a plain weaver.

New England has always held the first place in the matter of fancy weaving, which is very natural, as it is the most prominent cotton textile section in the country. It has experienced weavers at hand, who understand the work and can turn out the product in a satisfactory manner. It is quite natural that the New England section should turn more and more to finer and fancier lines of production, owing to the formidable competition that the South is creating in the staple lines. The fancy goods offer a higher value per pound of cotton and the New England section has also had the proper facilities best suited for the work.

With the increase in the number of plain looms in the South, the conditions for weaving finer goods are gradually becoming more favorable. The plain loom weavers are getting experience that can be used to advantage in the fancier weaving, in the same way that the New England weavers have had the same kind of training.

That the South is forging ahead in the field of fancy weaving is accurately shown by statistics from the last Census. In 1900, the Southern states contained a total of 110,010 looms, of which 3,856 were fancy looms. In 1905, there was a total of 179,752 looms in the South, of which 10,695 were fancy looms. The total increase of looms in that period was about 63.4 per cent., while the increase in fancy looms was about 177 per cent. A comparison of the progress of New England in the same period is as follows: In 1900, there was a total of 298,885 looms, of which 31,635 were fancy looms. In 1905, the total had risen to 324,058 looms, and the fancy looms had advanced

to 41,443. The total increase of looms in that period was about 8.4 per cent., and the increase of fancy looms was about 31 per cent. The number of fancy looms by States in the South in 1905 was as follows:

Alabama	349
Georgia	1,702
Kentucky	
Louisiana	384
Mississippi	
North Carolina	4,589
South Carolina	3,084
Tennessee	552
Texas	
Virginia	35
Total	10,695

The South is becoming better equipped every day for manufacturing fancy goods and it seems quite probable that the magnificent record will be continued if not surpassed.

BOARD OF GOVERNORS OF A. C. M. A. MEET.

A meeting of the Board of Governors of the American Cotton Manufacturers' Association was held in Charlotte, N. C., on October 8th for the purpose of selecting a city for the next convention of the Association which will be held on May 18-19, 1910. Among the cities extending invitations for the meeting were, Charlotte, N. C., Atlanta, Ga., Richmond, Va., Old Point Comfort, Va., St. Louis, Mo., Memphis, Tenn., Louisville, Ky., Cincinnati, O., Mobile, Ala., Atlantic City, N. J., and Niagara Falls, N. Y. The selection of the city was made by ballot, Charlotte, N. C., being chosen for the next meeting.

The question of curtailment was brought up and discussed at length by the members, and after ascertaining the status of the industry and the disparity between the price of the raw material and the finished product, the following resolutions were passed:

"Resolved, That in view of the disparity now existing between the price of cotton and cotton goods, we resolve:

"1. That a committee of five be appointed to formulate a curtailment agreement.

"2. That we recommend to every mill which is in a position to do so to sign this agreement and enter upon a general curtailment until the price of goods becomes on a parity with the price of cotton."

A special committee was chosen to formulate a curtailment agreement and consisted of D. A. Tompkins, Charlotte, N. C.; Lewis W. Parker, Greenville, S. C.; W. A. Erwin, Durham, N. C.; E. A. Smyth, Greenville, S. C., and T. H. Rennie, Pell City, Ala. A few days after the meeting Secretary Bryant mailed out letters to all the members of the Association, each letter containing a copy of the resolutions passed at the meeting with an explanation as to why such action was taken, and an agreement for them to sign if they felt so disposed. The agreement was as follows:

"We, the undersigned, agree to curtail operations of our mill one day or more each week until goods advance to a parity with the price of cotton. The agreement is conditional upon signatures of manufacturers representing 60 per cent. of the spindles of the Association and will become operative upon statement of the committee to this effect."

It will be noticed that the manufacturers do not aim to lower the price of cotton, but their object is to bring the price of finished goods up to a figure in keeping with the high price of cotton. The following members of the Board were present at the meeting: L. W. Parker, president of the Association, Greenville, S. C.; C. B. Bryant, secretary and treasurer, Charlotte, N. C.; E. A. Smyth, chairman board of governors, Greenville, S. C.; Aug W. Smith, Spartanburg, S. C.; Leonard Paulson, New York; W. A. Erwin, Durham, N. C.; Ridley Watts, New York; C. H. Moody, Alabama City, Ala.; M. M. McCall, Opelika, Ala.; E. Chappell, Atlanta, Ga.; John C. Rankin, Lowell, N. C.; W. H. Harris, Pawtucket, R. I.; L. D. Tyson, Knoxville, Tenn.

In addition there were also present and participating in the meeting by invitation of the board, T. H. Rennie, Pell City, Ala.; S. B. Tanner, D. A. Tompkins, R. M. Miller and J. T. Anthony, Charlotte, N. C.; R. S. Reinhardt, Lincolnton, N. C.; Caesar Cone, Greensboro; J. W. Cannon of Concord, N. C.; W. C. Heath of Monroe, N. C. and George B. Hiss of Charlotte.

NORTH CAROLINA COTTON MANUFACTURERS' ASSOCIATION.

The executive committee of the North Carolina Cotton Manufacturers' Association met at Charlotte, N. C., on October 14th to discuss the present situation affecting mills. The members of this Association represented about 2,000,000 spindles in that State.

The following resolutions were passed before adjournment:

"Resolved, That the executive committee of the Cotton Manufacturers' Association of North Carolina endorse the curtailment resolutions as adopted by the board of governors of the American Cotton Manufacturers' Association on the 8th, and that all mills in position to close are requested to sign up the agreement and forward to Mr. C. B. Bryant secretary.

"Resolved, That Messrs. C. E. Hutchison and L. R. Hagood be appointed a committee on behalf of the Association to confer with yarn commission houses with a view of establishing a parity between yarns and cotton.

"Resolved, That it is the unanimous sense of this meeting that all mills be requested and urged to discontinue the practice of consigning yarns, which is so demoralizing to the market.

"Resolved, That Mr. A. C. Phelps prepare articles of agreement for establishing a commission selling agency among the yarn mills of the South, and report to the next meeting of the Association."

PLANS FOR CURTAILMENT IN AMERICA.

A concerted plan for the cotton mills of this country to cope with present conditions brought about by the disparity in the prices of raw cotton and finished materials is rapidly being evolved and if successfully inaugurated, will mean practically country-wide curtailment.

Textile manufacturers of Europe had previously felt the necessity for curtailing production and for some months have carried out the movement under the direction of C. W. Macara, president of the International Cotton Federation. The inception of the movement in the United States originated with the Arkwright Club of Boston, which

represents about 14,000,000 out of a total of 17,000,000 spindles in New England. On September 15, the Club sent out to all of the cotton mills in the New England district, forms of an agreement for a curtailment to be signed by the manufacturers. The agreement calls for the suspension of operation for 224 working hours between the date of final agreement and August 1, 1910, and to become effective when 7,000,000 spindles have entered into the movement.

The general idea prevails that curtailment could not begin satisfactorily previous to January 1, 1910, owing to present orders which require full time in order to make proper deliveries.

Another impetus to the movement for curtailment was given in Charlotte, N. C. on October 8 by the Board of Governors of the American Cotton Manufacturers Association, when a special committee was appointed to formulate an agreement for curtailing production, and obtain the signatures of those mills that would enter the agreement.

The idea of the agreement is simply a compact between the mills belonging to Association, which represent nearly 20,000,000 spindles, to curtail production by suspending operations at least one day per week until the price of finished material advances to a parity with that of cotton.

The agreement is to become effective as soon as 60 per cent. of the manufacturers have signed it. It seems very likely that the movement will meet with general approval among the mills and that the required 60 per cent. will signify their intention to enter the movement at an early date. The South Carolina Association and the North Carolina Association have taken action in this direction.

A dispatch from Spartanburg, S. C., dated October 25th stated that 16,000 looms and 500,000 spindles in Spartanburg County were idle and 20,000 operatives were out of work, caused by the closing down of the majority of the largest mills, on account of the high price of cotton. The shut down will extend for an indefinite period. Many of the operatives will seek employment on farms until the mills resume operations. It was claimed by the authorities of the mills that they could only lose money by operating the mills with cotton at 14 cents and the present price of cloth. Among the larger mills to shut down were Clifton, Arkwright, Converse, Pacolet, Whitney, and Lockhart. It was stated that other mills in the State would close down by November 1st. The mills mentioned above have been running for only five days a week for some time.

INTERNATIONAL SPINNERS' CONFERENCE.

The International Conference of Cotton Spinners met at Frankfort, Germany, on October 5 and 6 with representatives present from the United States, Great Britain, Germany, France, Italy, Austria-Hungary, Belgium, Portugal, and Holland. The purpose of the meeting was for a discussion of conditions in the cotton and textile trades, and the necessity for an international agreement to limit production as a solution of the problem. A resolution was adopted by the conference setting forth their satisfaction with the progress toward curtailment that was being made by the American cotton spinners.

The following cablegram was sent to the Arkwrigh Club of Boston:

"The committee expresses great satisfaction with the steps taken by the Arkwright Club regarding curtailment of production in American mills. Reports from countries affiliated with the International Cotton Federation are to the effect that the decision for short time working has been practically unanimous in view of the present condition of trade and will be continued on a larger scale.

The following resolution was also adopted:

"Whereas, all the European spinners have expressed the opinion that the large visible supplies of cotton, together with the prospective favorable East Indian and Egyptian crops, will suffice to cover the requirements, even notwithstanding the unfavorable American outlook:

"Therefore it is urgently recommended in view of the unusually high price of cotton and the unremunerative selling price of goods that the existing restrictions must be maintained and extended as far as possible."

OBITUARY.

James Ingram, agent of the Washington Mills, of the American Woolen Co., of Lawrence, Mass., and the Riverside Mills at Providence, R. I., died in Boston on September 30 after a simple operation on his throat. The operation itself was successful but after Mr. Ingram had recovered from the ether he sustained a shock which burst a blood vessel in his head, causing death. He was born at Wiltshire, England, in 1852 and was, therefore, 57 years of age. Mr. Ingram was pre-eminently a self-made man and the high position he held in the textile world was due to his own untiring efforts.

His early education was very meagre as he only went to school until he was about eight years of age. His mother and father were hand-loom weavers and required the services of their son to wind the bobbins for the hand looms. It is said that his first wages were 36 cents per week and that his earnings were always small until he reached the age of twenty-one, when he emigrated to America in 1874.

His first employment in this country was with the Wanskuck Mills of Providence, R. I., as a weaver. He remained with these mills for about twelve years and while there learned loom fixing. The next three years were spent in a mill in Clayville, N. Y., as a loom fixer. From there he went to Lawrence, Mass. as overseer in the Bay State Mill which is now the Washington Mills. At that time the equipment of the mill was very small, but was gradually increased until now there are between 1,500 and 1,600 looms in operation. When Mr. Ingram first took charge of the weave room, the mill employed 500 hands; there are now 6,000 employees in the mill.

In 1891 Mr. Ingram was promoted to the superintendency of the mill, which position he held until the mill was taken over by the American Woolen Co., when he was then made its agent. He was made agent of the Riverside Mills at Providence, R. I., a few years ago.

PROGRESS OF COTTON MILLS IN JAPAN.

Vice-Consul Walter Gassett writes from Kobe that cotton-spinning mills in Japan have been adding weave rooms, and that it is now thought still more economy would result if spinning, weaving, and cotton printing could be carried on together. The Osaka Spinning Company plans to print cotton flannel and other textiles, and it is expected that other companies will follow the example. It is stated that the weaving industry of Japan has made so much progress that cotton prints and cotton satins are now not much inferior to imported goods in price and quality, and they no longer require government protection. But the industry of weaving Victoria lawns and cotton velvets is still in its infancy, and it is understood that the Government contemplates imposing a higher customs duty for its protection.

SOUTHERN TEXTILE ASSOCIATION.

SOUTHERN TEXTILE ASSOCIATION.

The Southern Textile Association held its fourth quarterly meeting at Raleigh, N. C. on October 20th with a large and enthusiastic membership in attendance. Arrangements were made to hold morning and night sessions so as to give the members opportunity in the afternoon to visit the North Carolina State Fair, which was in progress during the week. Vice-President W. P. Hamrick of Columbia, S. C., was present to open the meeting, the program consisting of a business meeting after which specially prepared papers were read by several prominent mill men of the South. The morning session was held in the Assembly Hall of The North Carolina Agricultural and Mechanical College. The College has a fully equipped textile department which proved of great interest to the visiting overseers and superintendents. This meeting of the Association is the first anniversary of its organization. The rapid growth of membership during this brief period promises to make the organization one of the strongest of its kind in the country. The members are manifesting great interest in the different meetings, and this fact more than any thing else will serve to increase the popularity and usefulness of the Association. The actual membership exceeds 300 already and bids fair to show an enrollment of 500 in the near future.

The election of officers was held at the July meeting in Spartanburg, so that practically the entire time was devoted to addresses and papers relating to textile affairs. Among the papers read were:

"Health of the Operatives," by A. S. Winslow, Clinton, S. C.; "The Card Room," by Alfred N. Landau, Charlotte, N. C.; "Time Economy in Mills," by G. F. King, Kings Mountain, N. C.; "Weaving," by William Nelson, Neuse, N. C.; and the "Spinning Frame," by T. F. Cuddy, Clio, S. C.

An important change was made in the time of holding the meetings. Heretofore, the meetings had been held quarterly, but it was agreed to hold only three meetings a year in the future, in February, July, and October. The next meeting in February will be held at Columbia, S. C., the exact date of which will be decided later.

The night session was held in the Chamber of Commerce building, where the Association members were also the guests of the Merchants' Association at a smoker during the evening. After the paper on "Weaving as a Skilled Occupation," by Will Nelson of Neuse, N. C., was read, president J. B. Pearce of the Merchants' Association ushered the guests into the banquet room where a feast of fruits waited them, to be followed by the choicest brands of Sir Walter Raleigh's specialty.

The members then returned to the meeting hall to hear a short address by Edward E. Brinton of the "Charlotte News" and "Observer," and other short talks by cotton mill men.

Among those attending the meeting were: J. H. Bagwell overseer Hoskins Mills, Charlotte, N. C.; Wm. H. Bigelan, E. E. Bowen overseer Great Falls Mills, Rockingham, N. C.; N. T. Brown superintendent Pilot Cotton Mills, Raleigh, N. C.; J. E. Buck overseer of Rosemary Mfg. Co., Rosemary, N. C.; R. E. Buck of Arnold Hoffman Co., Charlotte, N. C.; David Clark editor, Charlotte, N. C.; J. H. Cramer of Andrews Loom Reed & Harness Co., Spartanburg, S. C.; A. C. Cole, J. D. Cooper, Henderson, N. C.; B. S. Cottrell of G. M. Parks Co., Charlotte, N. C.; R. H. Craig, superintendent Harriett Mills, Henderson, N. C.; J. S. Crowen of Andrews Loom Reed and Harness Co., Spartanburg, S. C.; S. A. Crutchfield overseer Pilot Mills, Raleigh, N. C.; T. F. Cuddy superintendent Octoraro Mills, Clio, S. C.; A. Culberson superintendent Ella Mfg. Co., Shelby, N. C.; J. E. Curry overseer Pearl Cotton Mills, East Durham, N. C.; J. B. Donnelly master mechanic Pilot Mills, Raleigh, N. C.; A. T. Escott secretary Neuse River Cotton Mills, Raleigh, N. C.; G. S. Escott editor, Charlotte, N. C.; J. B. Ferrell overseer Olympia Mills, Columbia, S. C.; C. G. Foster superintendent, Greenville, S. C.; John W. Fox of Westinghouse Co., Charlotte, N. C.; W. P. Hamrick superintendent Olympia Mills, Columbia, S. C.; E. H. Hathaway of Universal Winding Co., Charlotte, N. C.; Morris Hendricks assistant superintendent Buffalo Mfg. Co., Stubbs, N. C.; E. M. Henley assistant superintendent, Duke, N. C.; D. H. Hill president A. & M. College, Raleigh, N. C.; E. A. Hill superintendent Tucapau, (S. C.) Mills; J. L. Hope overseer Hannah Pickett Mills, Rockingham, N. C.; B. F. Houston; S. H. Howard superintendent Holt-Williamson Mills, Fayetteville, N. C.; J. C. Keller superintendent Cora Mill, Kings Mountain, N C.; G. F. King chief engineer Dilling Cotton Mills, Kings Mountain, N. C.; R. N. Knight overseer Erwin Mill No. 2, Duke, N. C.; Hugo Koblenger of New Brunswick, (N. J.) Chemical Co.; Wm. Crawford overseer Erwin Mill No. 2, Duke, N. C.; Albert N. Landau, Charlotte, N. C.; A. W. Latta of General Electric Co., Charlotte, N. C.; J. S. McDonald superintendent Marlboro Mills, Bennettsville, S. C.; Albert Millmore; Thomas Nelson director Textile School, West Raleigh, N. C.; Will Nelson superintendent Neuse River Mills, Raleigh, N. C.; Frank G. North of Barber Coleman Co., Atlanta, Ga.; F. M. Osteen superintendent Poe Mfg. Co., Greenville, S. C.; J. S. Osteen superintendent Brandon Mills, Greenville, S. C.; W. B. Pratt, S. B. Rhea chief engineers Louise Mills, Charlotte, N. C.; C. R. Riddle overseer Granby Mills, Columbia, S. C.; T. L. Sanders, Shelby, N. C.; John E. Scott of John W. Fries Co., Winston-Salem, N. C.; O. L. Smith superintendent Weldon & Shaw Cotton Mills, Weldon, N. C.; W. R. Smith overseer Caraleigh Mills, Raleigh, N. C.; H. N. Steed instructor Textile School, West Raleigh, N. C.; W. A. Stephens overseer Pearl Cotton Mills, East Durham, N. C.; C. D. Taylor of Victor Show Ring Traver Co.; L. W. Thomson of Joseph Sykes Bros., Charlotte, N. C.; J. W. Trigg overseer Duke, N. C.; T. B. Wallace superintendent Watts Mills, Laurens, S. C.; W. W. Warren superintendent Louise Mills, Charlotte, N. C.; C. T. Watkins Columbia Mfg. Co., Ramseur, N. C.; and E. O. Winston overseer Pearl Cotton Mills, East Durham, N. C.

HEALTH OF OPERATIVES.

BY A. S. WINSLOW.

The health of the operatives in a cotton mill is, to a certain extent, in the hands of the officials. While much

depends on the operatives themselves, it may be stated with truth that cotton mills are being built with the health of the operatives much in mind. This is especially noticeable in the high ceilings and tall windows, the latter supplied with transoms, to permit the impure air, as it rises, to pass out, and the pure air from outside to come in, thus reducing the danger from draft or exposure to the employee to a minimum.

Careful attention is given to keeping the floors clean, to maintaining comparative freedom from dust, to the

A. S. WINSLOW.

providing of a plentiful supply of pure water for drinking purposes, and regard is also being had to the matter of personal cleanliness. With the latter end in view, lavatories are coming in for a marked share of attention. Closets should have as little woodwork as possible. Enclosed bowls are dust and filth collectors, hence disease breeders. Open plumbing should be the rule. The floors and lower walls should be of cement or tile with sufficient pitch to the floor to allow for complete drainage. Closet bowls and urinals should be of porcelain, iron or earthenware, and in addition to disinfectants, a hose should be provided for the flushing or washing of the interior daily.

Spitting on the mill floor is and should be promptly condemned. The spitting habit is filthy, dangerous, and a distinct menace to health. It is known that this is especially true as related to tuberculosis. The dried sputum, in the form of dust, is inhaled, becomes embedded in and breaks down the delicate lung tissues, and the mischief is done. In time we shall doubtless discover that catarrhal and similar troubles are readily traceable to this mischievous spitting habit. The mill official owes it a duty to himself and to the operatives to set the seal of his emphatic disapproval upon this deadly, dangerous habit. Pure air, good sanitary plumbing, pure water, personal cleanliness, and reasonable care comprise about all that a mill official can do in the mill in the way of looking after the health of the operatives.

We face a different and rather difficult problem when we come to consider the mill tenement houses. As a rule they are not so located as to allow for connection with a suitable system of sewerage, and as a result danger arises by reason of careless acts of the operatives themselves, such for instance, as the throwing of dish water and refuse from the back door. Too much reliance is placed upon the absorptive qualities of the soil, and too little attention is paid to the hot sun, and the resultant changes that follow in the messes at the back door. In my opinion this constitutes a distinct menace to the health of the operatives. It is certainly true that typhoid fever and kindred diseases are directly traceable to improper drainage and carelessness on the part of the keepers of the houses. All refuse from the table and kitchen, not suitable for burning, should be kept in a receptacle made for that purpose, and at suitable intervals, taken away and properly disposed of. Dish water, wash water, and all other fluids, should be deposited or cared for in such a way that contamination of the water supply for the household is made impossible. Outhouses are a distinct menace to health unless properly looked after. Wood ashes, collected in iron vessels and scattered around and under such places will be found of value, and the same is true of the ordinary disinfectants.

Personal advice and careful insistence upon the observance of the laws of health, both in and out of the house count for much, and visits by the superintendent for personal inspection at intervals will also be found of value in the maintaining of good health on the part of the operatives. Good health among the operatives is an asset of value to the manufacturer. It means more and better work. The knowledge of this fact explains the increasing care of the operative by the company both in and out of the mill. His physical, moral, and spiritual health are being considered so carefully to-day that the old-time prejudice against employment in the mill is fading from the public mind. The cotton mill as a place for employment has passed the stage of experiment and has outlived the spirit of prejudice so manifest in other days. The cotton mill is now known to be one of the healthiest places of employment in the land. In claiming this, we have distinct support from an unquestioned source of authority. In a letter written by Dr. C. W. Stiles of the United States Public Health and Marine Hospital Service, among other things he says:

"In an address I discussed the general subject of hookworm diseases among the tenant whites of the South. I described the unsanitary conditions under which the tenant whites of the rural districts were living and the vastly improved, though not perfect sanitary conditions they enjoy when they come to the cotton mills. I said that I looked upon the cotton mills as the greatest and almost the only real friends the poor whites of the South have. I took the position that there is another side to the child labor question, a side not generally understood; that I considered these children infinitely better off in the cotton mills than on the soil polluted, disease breeding, one-horse farms.

"About 66 per cent. of the Southern farm houses I have seen have no privy of any kind, and many of the country schools have no privy. As a result of the soil pollution, diseases are wide spread, and many of these country children are extremely anaemic and show a high death rate. When they enter the cotton mills they naturally take their farm diseases with them, and persons unfamiliar with the existing conditions have, upon finding these anaemic children in the cotton mills attributed the anaemia to the mill life and the breathing the cotton lint. As a matter of fact, however, upon reaching the mills, the children exchange an intense degree of soil pollution for a very much lessened amount of the same. Theory demands

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that, as a rule, their anaemia decreases with their continued residence at the cotton mill village, and that their death rate will decrease. My observations are that the demands which theory makes, are confirmed by practical observations. This does not mean that I am an exponent of child labor as an abstract proposition, but rather that I look upon child labor in the South as the lesser of the two evils, and given the present medieval conditions existing on the one-horse tenant farms, I view child labor as an actual blessing when compared with the child misery which is found more particularly in the sand lands and in the Appalachian regions."

In continuation of this line of thought your speaker would call your attention to a physician from another section of the country who has been making a careful study for several months past of farm, city, and mill life in the South. He says that the statements made by Dr. Stiles in his letter are not overdrawn, but that the Doctor might well have extended his criticism to other than tenant whites of the one-horse farm. He tells me on his visits to the planters' homes, as well as home life in the towns where more modern living is looked for, that the unsanitary condition which prevails borders the deplorable; far more unsanitary and dangerous to health than any cotton mill would allow or tolerate.

The fact is, and we have a right to be proud of it, that the cotton mills are better suited to the operatives than many places where the world has been taught to look for health. The mills may not be perfect, for human as well as local limitations will not permit us to attain unto perfection, but we may boldly proclaim that the cotton mills are safe places of occupation from a health point of view, and that the mill officials are interested in and intent upon the maintenance of sound health among the operatives. And we are not only justified in claiming this, but we may safely challenge the world to disprove our statements.

THE CARD ROOM.

BY A. N. LANDAU.

It is generally understood and conceded by all intelligent mill men that the most important process performed on the stock is carding. It is the operation which determines the quality of the mill's product, and the amount of the mill's balance in the bank; it is the indicator of the quality of the superintendent and the skill of the carder. With good carding we can make good yarns; with poor and faulty carding, no amount of skill in spinning or weaving can remove the defects left or made by poor carding.

To briefly summarize, we note that the functions of the card are (1) to disentangle the cotton fibers, or the separation of tufts, bunches, etc., into individual fibers; (2) the commencement of their parallelization; (3) the removal of smaller particles of dirt and seed left by the picker, and (4) changing the formation of the stock from a lap to a sliver with the consequent reduction in weight.

The first point that requires consideration is the condition of the lap fed into the card. As all the irregularities, unevenness, the thick and thin places, and lumps and hollows in the lap are exactly reproduced in the card-sliver, and as all the dirt not removed by the picker must be removed by the card, it is absolutely imperative, for the complete success of carding, to have good laps to start with. It is not enough to have the cotton in a sheet of even thickness, but the sheet should be clean. Every particle of dirt and every impurity which can be expelled by the beaters on the various pickers should be taken out and kept out, and the only work thrown on the card teeth should be the removal of short fiber and those adhering impurities which the picker could not remove without breaking the fiber. Whatever improvement we attempt in carding must be preceded by an advance in the methods of the picker room. If the extreme delicacy of the fine points of the carding surface be borne in mind, it will be seen that the practice of having the card do the work of the picker in removing the heavy impurities is wrong in both theory and practice.

The first rotating component the stock meets after the feed roll is the licker-in, whose function is to feed the fiber to the cylinder. Under the licker-in we come to the mote knives, much neglected and much abused by our Southern carders. Their function is to scrape off the large lumps and impurities, which, on account of the centrifugal force acting on the stock, stick out and come in contact with the knives. When it is remembered that all the dirt and lint taken out by the knives means so much less for the delicate flats, the importance of this setting is realized. Furthermore some short lint should be taken out also, that is, just enough to show you that the knives are working. As a rule, a distance of 12 tight gauge and 9 loose guage for fine yarn, and 17 for coarse yarn, according to the conditions, give good results.

Another important setting is that of the feed plate to the licker-in. It is essential in setting the feed plate that we take into account the staple; a little observation will lead to the correct setting distance. The gradual and not sudden detachment of the parts is what is wanted, and the combing action of the licker teeth is very useful in accomplishing this. As the licker teeth pass through the fibers over the nose of the feed plate, they both comb and straighten them, and on account of the way they are set and their shape, there is no danger of their getting choked. On account of their high velocity the heavy impurities are partially removed, and those fibers not held in the nip of the feed roll are removed, while those held are combed and straightened, which action is aided by the dish feed. The shorter the staple, the less the distance between the inner tip of the licker-in teeth and the inner face of the dish plate.

From this analysis it is easily seen how important it is that the licker-in should be in first-class condition. The teeth should be kept as smooth as glass, accurately set and of the correct shape. A bad licker-in will make enough waste and cause enough lost production in one week to pay for recovering three times a year.

Assuming to have the fiber delivered to the cylinder, we will now follow it around until it is stripped from the doffer. You will remember that on account of the natural twist possessed by the cotton fiber, it has a tendency to twist around any adjoining fibers, which makes it difficult to straighten. It can be shown by calculation that the licker-in can not feed sufficient cotton to enable the cylinder to be always taking up fibers, as the number of teeth on each and their respective velocities render it impossible for each tooth on the cylinder to always have one fiber on

it. There are not enough fibers to go around, and consequently the fibers will be held by the teeth in a free manner. A card tooth should only grip the fiber for a short distance, and the hold depends on the angle of the tooth.

It is necessary that a certain freedom from restraint should be left the fiber, otherwise they could not be effectually treated by the flat teeth, for if the fiber were imbedded in a mass of others it could not rise to be combed by the flats along its free portion.

From the time the fiber leaves the flat and is deposited on the doffer, the carded end is free, and being relieved from tension it curls up. The curling up, together with the effect of slight air currents, causes the lack of parallel order in the finished sliver. The effect of air currents plays an important part, and while the modern method of framing does away with large air currents and air blowing out, still many cloudy webs and thin places are caused by air currents entering the card. Sometimes the web is full of neps caused by broken fibers getting curled and matted up and escaping the action of the flats.

Between the last flat and the doffer is the large space covered by the front knife plate, completely covering the breast of the cylinder and joined to the framing of the doffer. The covers are fitted very carefully and capable of careful adjustment. The surface is bright and smooth, and the upper end slightly curled, making a stripping knife. This cover keeps the fibers from standing out in radial lines, and keeps out air currents. When getting cloudy webs the knife plate is the first thing to look after. Its improper setting is also the cause of uneven slivers, because if the fibers move across the cylinder surface, they must leave a bare spot. Frequent examinations of the strippings should be made; their character is the indication of the setting and condition of the flats. The edge receiving the cotton first is the thinner on account of the "heel" of the flats. If the thickness varies on different flats, the flats are not all ground to the same surface. If the thickness at the receiving end varies, the heels are not the same.

The flats stripping for consecutive flats should only be connected by a very thin strip. A fault I have noticed so often is setting the flat stripping comb so close that it knocks the strips into the flat instead of cleaning them off. The under casings are very important in the working of a card. The purpose of these casings is to make possible the omission of fly, and care should be taken that nothing but fly should go out; damage to good stock should be guarded against. No rules can be given for the setting. Observation is the best. 3-16-inch at the front and 3-10-inch at the back have been used and given good results for one-inch cotton.

Strip your card before it needs it, and strip right; keep your stripper in good shape. Its work is too important to have it all battered up. Use a stripping box and clean your stripper for every cylinder and doffer. Make use of your flat stripper and burnisher, and have your flats reclothed from time to time, as they need it.

THE SPINNING FRAME.

BY T. F. CUDDY.

Contrary to the general belief, the improvements on textile machinery are as a rule rarely perfected in the shops. Improvements originate with the man who gets close to the machine. These ideas, freely given to fitters, traveling experts, and the representatives of the shop, are noted mentally and passed along the line to the engineers and drafting room, then patterned and finally cast and tried for results in the experimenting room.

Those who have followed the frame closely will have noted the following improvements in the last decade: The adjustable sampson, the larger size cross shaft, the lengthening of the rocker arm, giving us more room between the weights and floor; less horse-power and a steadier traverse, which is also added to by the improvement in the builders; and the larger cams and their drives. Surplus gears have been removed, and cut gears have succeeded cast ones. The practically positive roving traverse and rods, the easily removed back bars, and the enlarged tips for the top roll necks, give more and better product. The shifting handles and connections, also creels, have advanced, and loose pulleys are idle when not in contact with the belts. Cylinders have been strengthened and the boxes have ring oilers. With the above improvements we have been able to obtain a longer traverse, a larger ring and faster speeds, also improved accuracy of rings, and their finish.

There is also the centrifugal clutch spindle, which is not so well known at this time. Let me say on this subject that I know of a mill of 70,000 spindles on yarns, where it is a proposition to get enough hard waste from bad spinning bobbins to clean a part of a frame in a week. Their greatest trouble was to overcome the vibration; but fitted to a Whitin bolster, another mill of 70,000 spindles on yarns, is getting excellent results. The shank at the clutch has lacked the bending resistance with the pull given the spindles, by young doffers, but I dare say this has been overcome. I prefer these spindles on any number above 18s or 20s.

I will touch on the future frame. We hear of no radical change in the method of draughting, but we do want a faster running frame and a more constant speed.

The frame, in my judgment, is heavy enough to overcome all vibration, but more attention should be given to the smoothness of the castings, as well as the painting of the same. There are unnecessary collections of lint, caused by the present finish. This, however, and the erecting of same are up to the mills who receive frames and who should see that they are properly finished and erected to a nicety, prior to an acceptance of the frames.

On a belt-driven frame, nothing less than a fourteen-inch pulley should be used, to avoid slipping. Larger cut gears should be used where practical. A change in the construction of the spindle base is needed, doing away with the right angle oil reservoir, giving more freedom while cleaning, and preventing cotton from packing in the rods and spindles.

That future buyers will see the advantages of a wider gauge frame, is my opinion: These advantages are; the doing away with separators, the obtaining of a longer roving traverse, and a longer boss on steel rollers as well as longer roll bearings. Aside from the smoother and stronger yarn obtained, these points are invaluable, and, to me, compensate for the extra floor space necessary for the wider gauge machines.

We have a very satisfactory spindle at present in the Whitin gravity, at the speeds run; however, more speed is needed and improvements are in order. Compressed air that is coming so prominently into our mills, may

serve as a driver in the future in the form of a turbine style in the spindle base. I have looked for an electrical drive to spindles, but nothing of this character, to my knowledge, has appeared on the market. Insomuch as the present spindle speed is governed by the centrifugal speed of the traveler and its agencies, causing the destruction of the traveler by frictional heat, it strikes me that the revolving ring must help us to attain the high speeds which are available.

The Westinghouse Electric & Mfg. Co. of Pittsburg, Pa., are installing a direct-connected motor to the cylinder shaft of a twister at 1,700 revolutions per minute. This leads me to the subject of motor drives which are playing such a prominent part in mill construction in the Southern mills. They are the direct connected, connected by interchangeable intermediate gears, and the variable speed motors. It is true that they all throw out heat, but such a constant power was not developed to this point, to be overcome by any objection so trivial. The ventilation can be improved upon by vacuum ducts, but the constant speed we must have.

For a mill spinning a standard count or counts, the direct-connected motor inserted in the tail end of the frame, the cylinder having its bearings in the motor, gives an ideal drive. This drive, as the Westinghouse Electric & Mfg. Co. are developing it, with a high speeded smaller cylinder than we now use and a larger spinning whorl, overcomes the sharp angle of the band on the whorl; this is decidedly in the right direction. For the yarn mill on different counts, the interchangeable gear is necessary to attain the spindle speed best suited. The motor in this case should slide, or have an adjustable swing arm to care for larger or smaller driving gears.

The variable speed motor is commendable, giving as it does, a constant tension, which means uniformity and greater weight on bobbins, also an increase of production. When we consider the constant tension throughout the building of the bobbin, we can appreciate that the untwisted fibers emerging from the steel rolls are twisted uniformly, as they are delivered, whereas a change of tension causes an uneven draught, owing to the difficulty of properly fitting a traveler to run from the start to finish of a bobbin of yarn. As evidence of the advantage of this type of drive, a test recently made on No. 15s yarn with a spindle speed of 9,000, and cylinder speed of 1,100, front roll speed of 160 R. P. M. was increased 20 per cent. automatically, and in tensional proportion to the size of the bobbin, the increased speeds being on full bobbin, spindles 10,800, clyinder, 1,320, and 192 for front roll. This is a net gain of ten per cent. in time of filling bobbins.

On this drive, travelers being more constant in speed, from the rotative steadiness, preserve their life and also that of the rings. For some very interesting and practical data on these different drives I refer you to the Westinghouse Electric & Mfg. Co., who have this subject well in hand.

The creels of the frame should be metallic, if for nothing more than from a sanitary standpoint. The shippers, if driven by belt, should be of the style with handles under the line of deck boards.

On fine yarns, using staple cotton, the top front roller should exceed the diameter of the front steel roller. The steel roll should be 1⅛ inch diameter, this increase giving a better bite on draughting and a gain of one turn in eight on speed. The top rolls should be larger and have less frictional bearings in top bar tips, obtained probably by corrugating the tip.

WEAVING AS A SKILLED OCCUPATION.

BY WILL NELSON.

I have a big desire that you might see somewhat as I see, "that weaving is a skilled occupation." So impressed were we by the value of the weaving department to the rest of the mill that while an instructor in the Lowell School we coined this phrase, "the economics of weaving," thereby trying to raise that occupation to as high a plane as any manufacturing industry. If carding is the soul of the mill, then we wish to go on record as saying that the production of the fabric and its attendant parts are not only the body but the heart and mind of the textile, whether knitted or woven. No matter what grade of fabric is being made, skill is demanded if the best results are expected. The designer may plan his fabric and tell what yarns have to be made and possibly what staple to put into the yarns; yet a slight variation in the setting of the loom will so alter the value of the fabric that even two looms, side by side, having so far as man can make them the same identical construction, same number of threads, same counts of yarn, will show a different valuation on the cloth of 1-4 to 3-4 of a cent per yard.

In addition to the manipulation of the loom, the yarns help to get that cover on cloth which is the desideratum of all good skilled weavers, providing that cover is demanded; an unskilled weaver cares nothing about this. That the meaning of cover is not well understood, the following will show: I have heard overseers, second hands and fixers assert, "There was not a right and wrong side to a piece of plain cloth." How could there be, when it is one thread up, one down all the time? (I don't suppose any one in this room would say that), but such a fact does exist, that a plain cloth can be so woven that one side is much softer than the other, and, having a brighter appearance on that side, is of a greater value than a cloth not woven that way.

This also applies to other cloth where the filling is more prominent on one side than the other. The soft appearance is not only obtained but a more even cloth; the threads are equal distant, the bareness is gone, and for this alone it is worth while to study the timing and setting of the harnesses. I believe it is a fact that the finer grades of cloth demand a higher grade of skill, for weaving does not merely consist of putting the shuttle in the box, starting up the loom, drawing in one or two threads, and even keeping the belt on the tight pulley, as some seem to believe, but knowing how to handle a thread, understanding each individual loom so as to produce cloth that will pass inspection, in fact, making a warp weave under adverse circumstances.

To speak more definitely as to the management of a room. What does the management of a room mean? It means first, your word, your bond, although some can not appreciate it. It also means the little things, wear and tear of machinery, which are so often lost sight of as evidenced by the tremendous loss of power through faulty fixing of looms. It also means a low waste account, in fact, anything and everything that tends to save from loss and everything that tends to increase the output. There may be big production and yet not the ultimate low cost, for there may be too big a proportion of seconds. Sometimes

this will occur through switching from one extreme to the other.

It might appear as if we are digressing, but in our humble way we wish to develop the fact that skill of a high order is demanded in the weave room. Does the overseer know the loom? If he does not, he can not get from the room the best that is in it. It is not the best principle to run a loom, dobby, or Jacquard almost to the dying point and leave before the death occurs, no matter from what standpoint we look at it. It is good judgment to keep a loom in the best of repair; it not only gives the best results in the long run but a good return now. A patched, run-down loom is one of the first things that will ruin a skilled fixer and weaver, and make unskilled weavers more careless and indifferent to the inevitable results. Are your ears tuned to the right sound of the loom? Can you tell by placing your hand lightly on the whip-roll that the loom is not in good fix; that the shuttle is not running straight? What will the outcome of such knowledge on the manager be? His best fixer, second hand, etc., will very soon realize that the best is none too good; that his work will be appreciated by one that knows. The less skilled fixers will either try to make good, giving the overseer a chance to impart some of his knowledge, as they will seek fresh fields. Is the loom using up more power than is necessary? Are you aware that about six-tenths of the horse-power required to run a loom goes into the picking motion? How easy it is through indifference or lack of knowledge of this point alone to have looms using 1-2 horse-power instead of 1-3 horse-power. This seems small, and it is for one loom, but what of 10, 20, 50, 100, and so on, running the same way?

I have heard these words: "Keep up the power, though you tighten the binder." A more fallacious statement was never made. The shuttle has to enter into a small space at the best, but little larger than the shuttle. The binder projects into the box taking up what little space there is. If there was no pressure on the binder—merely the weight of it—some power would be required to drive the shuttle into the box. Add pressure of many times the weight of the binder, then what occurs? Not only more power is required to drive the shuttle in, but also to drive it out. Again, pressure is added by allowing the end of the binder to come in contact with a pin or some other fixed part of the loom, and if you measure some shuttle boxes you will find that when the binder is pressed as far back as it will go, the space for the shuttle is less than the shuttle. Is it any wonder that power is wasted and shuttles, etc., break?

But to leave the mechanical side: Can we impart a greater degree of skill to an employee? Can we develop the latent skill that certainly is in some of them? Most decidedly so, but those who oversee the several departments must first know the why and wherefore of the machines in their charge, and they must be able to impart some of that knowledge. We should get down to the bottom of things; understand the first principles, one of which is, the less you handle cotton yarn the better it weaves.

THE WORK OF THE BRITISH COTTON GROWING ASSOCIATION.

(*Continued from August.*)

(C)—SOUTHERN NIGERIA.

The operations in 1908 at Illushi and in the Uboho country have also suffered from the drought, but progress, though slow, is being made. The natives are beginning to realize more and more the possibilities afforded them by the cultivation of cotton, and it is hoped that in a few years time the annual production may be measured by thousands of bales instead of by hundreds as at present. The most satisfactory point in connection with Southern Nigeria is the fact that the cotton is of excellent quality, and readily salable on a par with middling American.

(D)—NORTHERN NIGERIA.

The effects of the drought were more seriously felt in

MALINDI—GINNERY OF THE BRITISH EAST AFRICA ASSN.

Northern Nigeria than in any other part of British West Africa. The Association's manager who paid a visit to Zaria and Kano, was informed by the natives that it was the most severe drought experienced for 35 years. The methods of cultivation adopted by the natives in the country lying between Zaria and Kano are not only superior to what one would find in other parts of Africa, but would compare favorably with European methods. The future prospects of this district appear to be very bright.

A regular system of steam transport has now been inaugurated on the River Niger under the management of the Northern Nigerian Government. Goods and passengers are conveyed at moderate rates from Forcados to Lokoja, and beyond when possible. The Governor gives a most encouraging report of the possibilities of the River Niger, which in his opinion compares favorably with the Mississippi. At a conference held in Manchester it was stated that there was an excellent harbor at Forcados, and that there was no serious obstruction between that point and Baro—the present terminus of the railway—with the exception of a few sand bars. With the aid of a dredger, there should be no difficulty in maintaining a channel with a minimum depth of 5 feet 6 inches throughout the whole year. A dredger is now being constructed.

The first 100 miles through which the railway passes is not thickly populated, but between Zaria and Kano there is a larger population, and it is stated that 50,000 to 80,000 bales of cotton are already being produced. The samples sent are of excellent quality.

Railway material to the extent of 20,000 tons was successfully conveyed to Baro during the few weeks when the Niger was "high," and the Northern Nigeria railway is now being rapidly pushed on. The first 50 miles of rails have been laid, and it is expected that the 150th mile will be reached this year. The railway should reach Zaria in 1910, and in 1911 it is expected that Kano—the "Mecca" of Lancashire—will be brought into economic touch with the rest of the world. The railway, though of light construction, is 3 feet 6 inches in gauge—the West African standard and the cost will probably not exceed $15,000 per mile.

4.—British East Africa.

Owing to unfavorable weather conditions and to serious attacks of insect pests, the East Africa crop of 1908, which is of the Egyptian type, was a failure. The Association has provided funds for the erection of an hydraulic press at Mombasa, which will be available to the general public and for other products besides cotton. This was necessary owing to the high rates of freight which are being charged for lightly-pressed cotton. The British East Africa corporation has now three ginneries at work, at Mombasa and Malindi (on the coast) and at Kisumu (on Lake Victoria). The Association has sent out an experimental engine worked by cotton seed gas, and also an experimental cotton opener for dealing with damp and matted cotton.

Nyassaland—A Cotton Field on the Bruce Estate.

An ordinance was passed enabling the Government to deal with seed from mixed and inferior cotton. There is no doubt that the provision of selected seed of a pure strain is the most vital factor in connection with cotton growing. The provision of an expert agriculturist is also essential.

Representations have been made to the Government as to the very inadequate service of steamers to East Africa, and it is highly desirable that arrangements be made for the establishment of a regular monthly service of steamers to Mombasa and Zanzibar, calling also at Cyprus and Port Soudan, both of which ports are badly served. These steamers might with advantage proceed further to Chinde—the port for Nyassaland—and Beria—the port for Northern Rhodesia.

5.—Uganda.

The brightest spot in the British Empire in 1908 was Uganda. The natives have taken up cotton growing seri-

ously, as will be seen from the following estimates of the crops during recent years:

1906 ..... 500 bales.
1907 .....2,000 bales.
1908 .....5,000 bales.

The quality of the cotton generally is excellent, and sales have been made at prices equal to that of middling American. Unfortunately, a large quantity of seed of various varieties was distributed in the early stages, with the consequence that there was seen a great mixture of cotton of all classes, with staples ranging from 1½ inches down to ½ inch in length. Representations were made to the Government that unless the matter was taken in hand at once, it migh be difficult, if not impossible, to deal with the question later on. The Governor states that the bulk of the inferior cotton has now been eradicated. Stringent regulations have been brought into force, and the Government has inaugurated large seed farms under expert supervision. A cotton inspector who had been trained in a Liverpool broker's office, was also appointed.

The most noticeable event during the year was the visit of Mr. Winston Churchill—the then Under Secretary of State for the Colonies—to East Africa and Uganda, and which is likely to have far-reaching results. Mr. Churchill reported that in Uganda alone there were over 20,000 square miles (12,800,000 acres) suitable for cotton cultivation, and over 1,000,000 farmers. Everybody interested in cotton cultivation should read Mr. Churchill's book, "My African Journey."

TRANSVAAL—LOADING COTTON AT TZANCEN.

6.—NYASSALAND.

In spite of a reduction of acreage, cotton growing has made solid progress in Nyassaland in 1908, and those planters who have continued its cultivation are among the ablest and most successful men in the colony. It has now been practically established that cotton of a superior Upland type can be successfully grown in the highlands, but the cultivation of Egyptian cotton in the lowlands has not yet proved a conspicuous success. Cotton still continues to head the list of exports from this colony.

The efforts which the Association has been making to establish cotton growing as a native industry have not so far produced any large results. The council has, however, continued the arrangements with their agents, the African Lakes Corporation, for buying and marketing native-grown cotton.

The council reports that after serious delays the railway to Blantyre has at last been completed, and planters may now market their products on more favorable terms.

Representations were made to the Association as to the excessive ocean freights charged on shipments of Nyassaland and Rhodesia cotton from Chinde and Beira to England. The agents were approached, in regard to the matter and the Council reports that the agents have agreed to carry cotton at $12.25 per ton.

7.—RHODESIA.

The operations of the Rhodesia Cotton Co. has not been altogether satisfactory, but the partial failure of the crops is due to the fact that cotton does not do well on newly-cleared land. Further experiments are being carried on this season. The British South Africa Co. is co-operating with the Association in this work.

A number of white planters have commenced growing cotton in Northeastern Rhodesia in the neighborhood of Broken Hill and elsewhere. A shipment of several hundred bales of Affifi cotton was recently sold at most satisfactory prices, ranging from 14 to 17 cents per pound. Gins and presses have been sent out to several planters, and arrangements have been entered into with the African Lakes' Corporation to assist the planters in the financing and shipment of their crops.

8.—SOUTH AFRICA.

Some most satisfactory cotton has been grown in the

Transvaal under the auspices of the Zoutpansberg Cotton Syndicate, and the Council has decided to co-operate with this company with a view to the development of the northern portion of the Transvaal.

Some small experiments have been continued in Natal, but so far the results have not been very satisfactory. Three hand gins were sent out, one to Zululand and the other two to the Vryheid district, where cotton was being grown experimentally. In Cape Colony some most beautiful samples of cotton have been grown, but the matter has not proceeded further than the experimental stage.

9.—Egypt and the Soudan.

The Egyptian crop still continues to show the same want of elasticity which has characterized it during the last few years. It is believed that this is largely due to the change from a "three years" to a "two years rotation." The whole question is receiving the most careful consideration of the Egyptian Government.

Cotton cultivation in the Soudan continues to make progress, and it is understood that some larger schemes are now under the consideration. Owing to lack of funds the Association has been unable to take any active part in the development of the Soudan.

10.—General.

Efforts are now being made to revive the growth of Sea Island cotton in Fiji, with some prospect of success.

Cotton growing in Queensland continues to make some progress, but it is feared that the regulations as to labor will prevent this colony ever becoming a factor in the cotton supply of the world.

Some small experiments are also being carried on in Borneo, but it is too soon yet to expect any results.

REINFORCED CONCRETE FOR TEXTILE MILL CONSTRUCTION.*

BY J. P. H. PERRY.

Why is it that reinforced concrete construction has been used so little for textile mill buildings, when for other types of industrial structures its adoption has been at an increasing rate? To a concrete man this condition is hard to understand. On the face of things, reinforced concrete would seem to be an almost ideal material for mill buildings, and yet with few exceptions there are practically no textile plants built of this very generally successful structural material. A study of the situation brings to light the fact that those who have the decision as to the class of construction which shall be used in new mills seem to misunderstand concrete or at least fail to appreciate certain of its properties. In submitting for your consideration various features of reinforced concrete, the attempt will be made to refer wholly to experience and by presenting facts, not theory, show that this material is entitled to your approval.

RESISTANCE TO VIBRATION.

Vibration is probably as frequently discussed by the textile world as any other phase of industrial procedure. Its effect upon mill buildings has been most carefully studied, and its cure or at least its partial elimination sought. Among the mill interests there seems to be a strong feeling that vibration is the one reason why reinforced concrete is not serviceable for their buildings; among practically all other industrial executives, vibration is generally considered the chief factor in influencing them to use concrete. The majority of owners of concrete plants are well satisfied that they get less vibration with this kind of construction than with any other type of building. Is the vibration of a textile mill so much worse than that in other factories that a structural material, which has been so uniformly successful as has concrete, is not to be trusted?

The Robert Gair Co., manufacturers of paper goods, have a large plant in Brooklyn, N. Y., consisting of two six-story brick and first-class mill construction buildings, and one nine-story and basement reinforced concrete factory. All three structures are filled with the heaviest presses, cutters, embossers, etc.—every type of the latest paper-making machinery. The vibration in the mill construction buildings is such that a plumb-bob hung parallel to any one of the walls will sway to a considerable extent.

The reinforced concrete structure directly across the street, subject to the same conditions of foundations, loads, vibration, etc., is remarkable for its rigidity. This building measures 231x200 feet 6 inches and is nine stories and basement, having ten acres of floor space.

The presses operate rapidly and have very heavy reciprocating parts, yet a coin can be stood on edge anywhere on their base frames, and it will remain in position as long as left there, which is a fair test of the vibration—this being on the seventh floor of the building. All through this great factory one may lay his hand against a column and feel scarcely a tremor. The saving in such a building in repairs to machinery and in power necessary to operate same will be discussed later.

Mill engineers sometimes are skeptical as to the power of reinforced concrete to resist long continued vibratory stresses. In answer to this the Robert Gair Co. building above referred to, has been standing in part, the building was put up in two sections with an interval of two years between, since early in 1905.

Even more absolute a refutation of the suggestion that continued vibration will injure reinforced concrete, is to be found by a study of the work of the engineers of the majority of the great railroad systems of this country.

It is difficult to imagine more severe vibration than that caused by a rapidly moving locomotive and train over a steel bridge. Added to the vibration is a tremendous pounding and shock. Nevertheless there are being built all over this country to-day, reinforced concrete decks, or road beds, on steel girder bridges. Some of these concrete slab decks have been in continual use since 1904, and their service has been such as to warrant the engineers of other railroads to authorize the construction of similar work on their own lines.

Not only will reinforced concrete withstand vibration satisfactorily after it has been erected and allowed to harden, but it will also resist injury from this source while in the process of construction. This fact that wet, freshly placed concrete may be subject to vibration and still take its set and result in a serviceable building, should indicate in a small way at least its strength. Furthermore for repair or reconstruction work this property is invaluable.

To show how very rigid and free from vibration the ordinary reinforced concrete factory building is, the Rogers, Pyatt Co., varnish and shellac makers, New York City, can be properly referred to. On the seventh floor of this ten story building, is set the heavy grinding machinery.

*Delivered before the National Association of Cotton Manufacturers, September, 1909.

On the same floor, not 30 feet away from the grinders is located the chemical laboratory of the company. To the surprise of the chemist, his delicate scales and refined measuring instruments are in no way interfered with, as the concrete floor does not transmit any vibration from the heavy machinery. From the very nature of the construction, reinforced concrete buildings should be more resistant to vibration than almost any other type. The floor slabs, or arches, beams, girders, and the columns are all poured or cast together, forming a homogeneous and monolithic mass of great density and strength. The reinforcement is so placed as to take up all tensile stresses and at the same time tie the building solidly together. In mills where there are looms or long lines of heavy presses, all operating in the same direction, there is bound to be some vibration with any kind of a building. With reinforced concrete construction, the vibration is reduced to a minimum.

WIRING AND PLACING SHAFTING.

The attaching of shafting and piping, and the handling of lighting wires in concrete buildings, is frequently questioned by those contemplating erecting new buildings of this material. There are different methods of taking care of this problem. The sockets or holes, as the case may be, are set or left in the forms before the concrete is poured. Cut-out boxes, switches, plugs and conduits for electric light wires are provided for in the same manner.

The repairs to machinery, the renewals of bearings, the amount of power required to operate machinery, the maintenance of shafting, and all similar charges in a manufacturing building of reinforced concrete are lower than in the mill construction type of factory. Shafting or machines once attached to or set on concrete floors remain in place. There is no tendency to walk and to getting out of line, with consequent increased wear on moving parts and bearings, together with an increase in amount of power necessary to operate.

If concrete floors are objected to as being either hard on the operatives or producing dust which would seriously interfere with the manufacturing process, it is quite possible to install wooden floors on top of the concrete slab. This of course increases the cost, but not seriously so.

Concrete walls do not need waterproofing. The impression is that reinforced concrete buildings having walls of the same material are damp. This is quite the opposite of the facts. After heavy storms, a 12-inch brick wall will show moisture, whereas a concrete wall will remain impervious. In this class of construction the concrete is placed quite wet and when set thoroughly the walls are very dense and homogeneous. During the process of drying out, the walls will undoubtedly be damp, but as this rarely, if ever, takes over four months, the building is dry by the time the stairs, partitions, heating, lighting, plumbing, elevators and other detail fittings have been installed.

BUILDING SPEED AND COST.

The speed with which reinforced concrete buildings can be erected is greatly misunderstood by many people.

The Rogers Pyatt factory, New York City, is a ten-story and basement reinforced concrete building. After the completion of the foundations, the roof was on in forty-seven working days, and the building turned over to the owners ready for occupancy in three and one-half calendar months. With proper organization a reinforced concrete building can be put up in time which compares favorably with steel construction.

Cost is usually the final determining factor in the choice of structural materials. Reinforced concrete will generally run from 5 to 15 per cent. higher in first cost than first class mill construction, and will be from 10 to 20 per cent. lower in initial cost than steel construction fireproofed. These percentages are not theoretical; they are based upon facts. In competition with mill construction the percentage depends almost entirely on the size of the building. For structures costing $40,000 and less, and of a height of four stories or less, the brick and wood construction will run about 15 per cent. less than concrete. On larger size buildings, however, concrete gets closer to the cost of the mill construction.

In considering the costs of different types of construction the initial cost should not be the only criterion. There are certain fixed charges which enter into the relative values of buildings. These may be briefly summarized as follows: Insurance, maintenance, depreciation, amount of light available, freedom from vibration, elimination of vermin, and the assurance that a fire can not destroy the building. It is difficult to put an exact monetary value on these different items. Each plant manager would have his own views on the subject, and local conditions would alter materially any assumptions. If, however, due consideration be given to the saving which can be obtained on each of these items by the use of reinforced concrete building, it will generally be found that even though the concrete structure cost complete 10 per cent. more than if mill construction be used, there will be a saving annually of from 1½ to 2 per cent.

The following is a brief list of textile or similar plants which have been built either wholly or in part of reinforced concrete: Hockanum Co. Mills, Rockville, Conn.; Eagle Spinning Mills, Hamilton, Ont.; Northwestern Knitting Co., Minneapolis, Minn.; Wood Worsted Mills, Lawrence, Mass.; Warrenton Woolen Co., Torrington, Conn.; Arlington Mills, Lawrence, Mass.; Alexander Smith Co., Carpet Mills, Yonkers, N. Y.; Bemis Bros. Mfg. Co., St. Louis, Mo.; Botany Worsted Mills, Passaic, N. J.; Minterburn Mills, Rockville, Conn.; Erwin Cotton Mills, West Durham, N. C.; Arnold Print Works, Adams, Mass.; Merion Worsted Mills, West Conshocken, Pa., and Crane Bros., Silk Mills, Kingston, Pa.

The questions of fireproofness, waterproofness, verminproofness, interior finish and exterior finish of reinforced concrete factory buildings can not be taken up in proper detail in the limits of this paper. If there is any one point about this construction which has successfully come through a rain of criticism and discussion, it is fireproofness. Baltimore and San Francisco tested concrete and found it good. Single fires like the Dayton Motor Car Works, the F. W. Tunnell Co., glue manufacturing plant, and the Pacific Coast Borax Co. buildings, demonstrate the absolute safety of this material. The sanitary features of reinforced concrete buildings, in waterproof qualities, and in the prevention of vermin are generally admitted. Interior finish as found in the ordinary concrete building consists of a brush coat of cold water paint applied directly on the concrete as it comes from the forms. Exteriors of concrete buildings may be of concrete, brick, or masonry.

The insurance rates applying on reinforced concrete buildings are as low as on any type of structure. In fact some of the mutual fire insurance companies offer to write the lowest rates on concrete industrial buildings; lower indeed than any other type of construction.

COTTON MANUFACTURING

DESIGNING AND CLOTH ANALYSIS.

SATIN WEAVES. PRINCIPLE OF CONSTRUCTION. DOUBLE SATINS. DRAWING-IN DRAFT AND HARNESS CHAIN.

(Contributed exclusively to COTTON.)

BY CHARLES E. BARNHARDT.

PART II.

The next class of weaves of most importance after the plain and twill weaves, are the "satins." A great many designers contend that there are only three classes of primary weaves; the plain weave, twills, and satins. From these three classes, all other weaves are derived. This is true in a certain sense, for if any woven fabric is carefully examined, one or more of these weaves, or some modification or alteration of them, is apparent in the cloth to a person familiar with designing.

It will be remembered that the characteristic of the regular twill weave is that it forms small diagonal lines running across the face of the cloth at an angle of 45 degrees. We assume, of course, that the threads per inch for warp and a filling are the same. This effect is produced by having each adjacent warp thread to stitch with every successive pick. The effect produced on the face of the cloth by the satin weave is quite different from that of a twill. The object of a satin weave is to distribute the interlacings of the warp and filling in such a manner that no trace of a twill line will be seen on the face of the cloth. Another characteristic is that with a filling face satin weave, practically all of the filling is on the face of the cloth. A warp face satin weave brings practically all of the warp to the face of the fabric.

The cloth produced by a satin weave presents a smooth and lustrous appearance, which makes it resemble, in some instances, satin cloth. Satin cloth is made of silk, using a satin weave.

Satin weaves are used very largely in producing different styles of cotton and silk fabrics, and are also frequently found in woolen goods. They are, perhaps, more extensively used in the manufacture of damask and table covers, than for any other class of goods. The ground or body of almost all of the cloth in this class of fabrics will be found to be a satin weave. Satin stripes are frequently seen in madras shirtings and fancy dress goods in connection with plain and figured weaves.

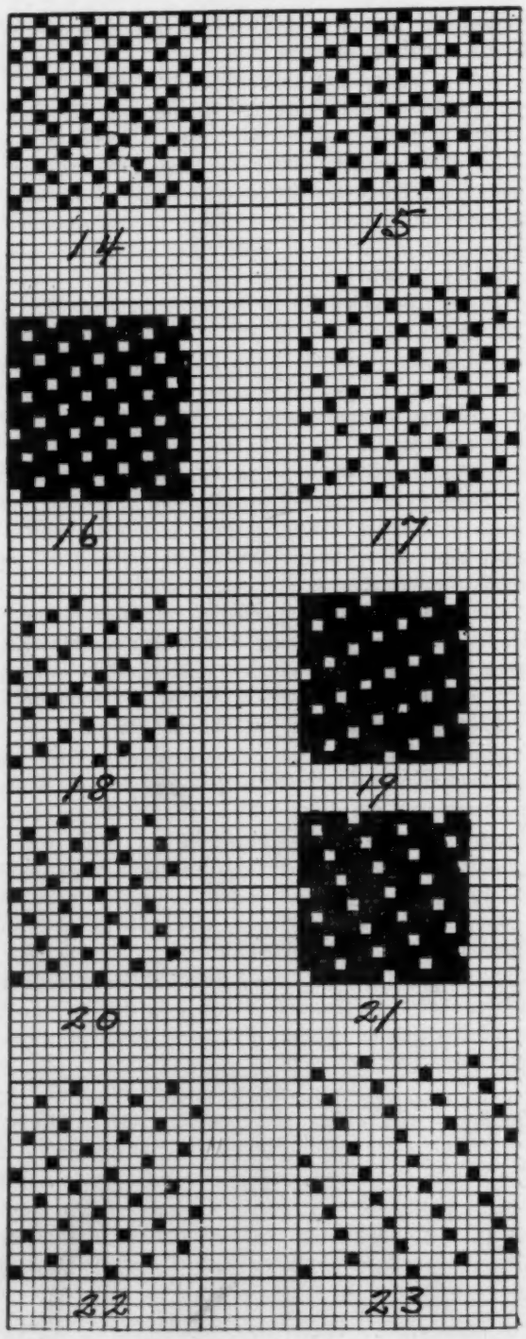
The smallest number of harness on which a regular satin weave can be produced is five. A regular satin may be made on any number of harness greater than five, with the exception of six harness. It is impossible to make a regular satin weave on six harness. The reason is that this number is not divisible according to the rule for producing satins, which will be given a little later on.

Fig. 14 shows four repeats of a four-harness broken twill, which is sometimes called an irregular satin, as it closely resembles a satin. It is usually classed with the satin weaves. The twill lines can be easily seen on the face of the cloth. This weave is frequently found in many classes of goods, and produces a pleasing ground or body effect.

Fig. 15 shows three repeats of the five-harness satin, filling effect. It will be noted that the construction of this weave is quite dissimilar to that of a regular twill.

PRINCIPLE OF CONSTRUCTION.

The principle of the construction of a regular satin weave is, that no two ends or two picks shall interlace consecutively in any part of the weave; also that each warp thread shall interlace with the filling only one time



WARP AND FILLING EFFECTS—SATIN WEAVES.

in one repeat of the weave. The rule for locating the points of interlacing in any regular satin weave is as follows: Divide the total number of harness used into two unequal numbers, neither one of which must be a multiple of the other. These two numbers should not be divisible by any other number. From this, it will be understood that either two or three may be taken as a counter for a five-harness satin. In Fig. 15, 2 is taken for the counter and the harness are raised in the following order: 1-3-5-2-4. When woven in this manner, the filling effect will be on the face of the cloth in weaving.

If it is desired to weave the cloth with the warp effect up, the weave will be painted as shown in Fig. 16. This is done by simply making the raisers sinkers and the sinkers raisers. In these articles the term raiser means that the warp is raised, and is indicated by painting in the square. A sinker means that the filling is raised over the warp and is indicated by leaving the square blank. Satins are usually woven with the filling side up, on account of making it easier on the loom, as there is only one harness raised for each pick. However, any fault or defect in weaving can be more readily seen if the cloth is woven warp effect up.

As has been stated, it is impossible to make a regular satin on six harness. However, Fig. 17 shows three repeats of an irregular satin made on six harness, which is frequently used. The effect of this weave is virtually the same as that of a regular satin, but the warp threads are not raised in regular order. In making a satin weave on any odd number of harness, two may always be used for a counter, because no odd number is divisible by two, neither can it be divided by a number which may be divided into an odd number.

For a seven-harness satin weave, we can use either two, five, three, or four for a counter. Fig 18 shows the filling effect of the seven-harness satin with two used for a counter, while Fig. 19 shows the warp effect of the same weave. Fig. 20 shows the filling effect with three used for a counter; and Fig. 21 the warp effect of the same weave. The only difference between using two or three for a counter, is in the angle of the line of stitching made. The cloth produced from either counter is practically the same.

For an eight-harness satin weave, it is possible to use only two numbers (three or five) for counters. Using three for a counter, the filling effect of the weave is shown in Fig. 22.

For a nine-harness satin weave, we can use either two, seven, four, or five for a counter. Fig. 23 shows the filling effect with four used for a counter.

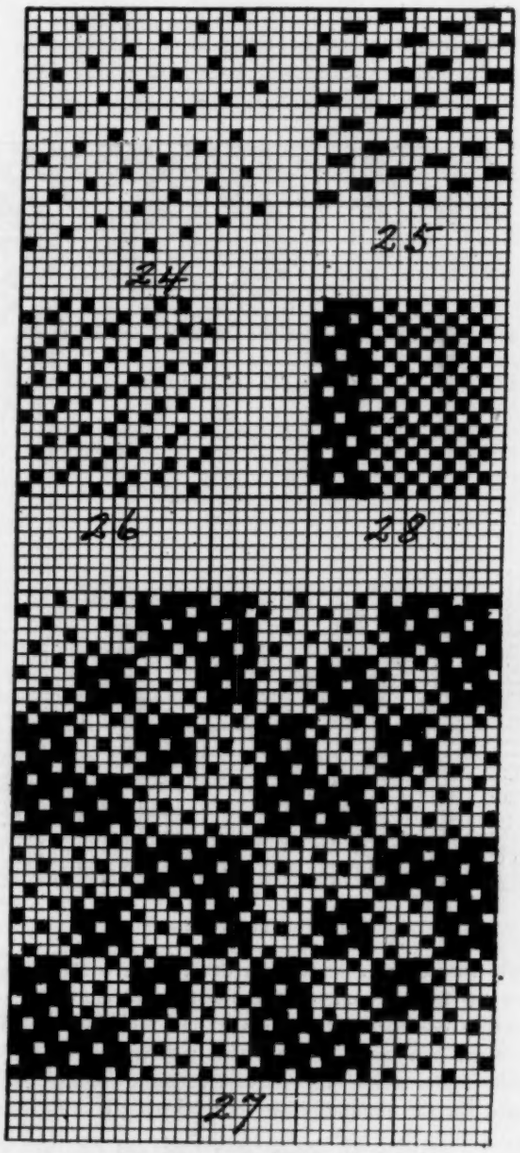
For ten harness, the only regular satin weaves that can be made are by using three and seven for counters. Fig. 24 shows the ten-harness satin weave with three used for the counter. These illustrations show the regular satin weaves found in most general use. However, they are sometimes found to run as high as sixteen harness on very fine work. From the examples given, the construction of a satin weave on any number of harness will be readily understood.

The construction of a satin weave is based on the effect desired. If a filling face effect is called for, there should be a greater number of filling threads per inch than warp threads. For instance, a well-known filling face satin weave construction is 64x124.

A warp face effect would call for a greater number of warp threads per inch than filling. A ticking 108x64 is a good example of this warp effect.

DOUBLE SATINS.

Another class of satin weaves, made from the regular satin, is called the "double satin." These weaves are formed by raising two adjacent ends according to a similar



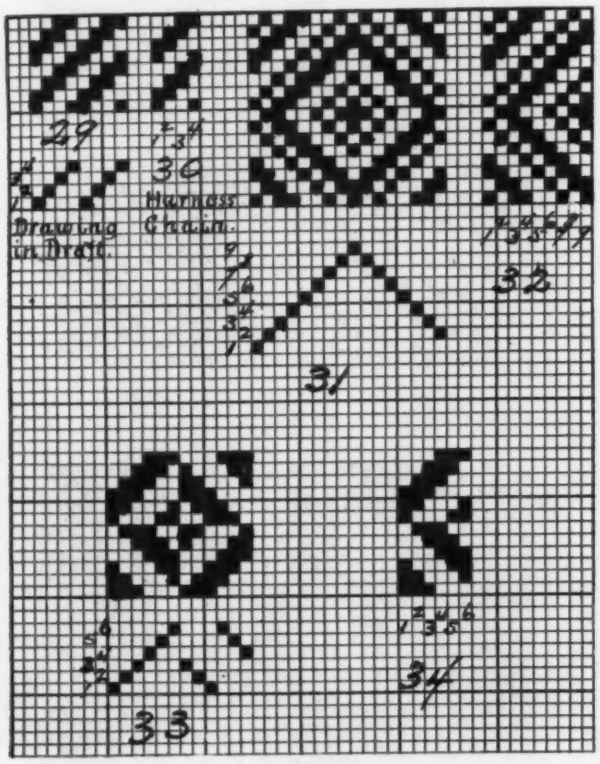
COMBINATION SATIN WEAVES.

arrangement used for regular satin weaves. Sometimes the third end is raised with the first end, instead of the adjacent end. Illustrations of these weaves are shown in Figs. 25 and 26. A regular eight-harness satin weave motive is used, with three as a counter.

In damask, towels, and table covers, we frequently find a combination of warp and filling effects in the satin weave which are commonly called checker board satins. An illustration of such a design is given in Fig. 27, with five-harness warp and filling effect satin weaves combined. In making designs of this character, the principal point to observe is to have the weaves cut off perfectly where the different effects join each other, that is, on the cutting lines, raisers must come opposite sinkers, and vice versa.

In making a fabric in which both the warp and filling

are white, different effects are produced by combining the satin weaves with other classes of weavers. New effects are also obtained in fabrics of this character by the way the warp is drawn into the reed. For example, Fig. 28 shows a plain weave combined with a five-harness warp effect satin. This design shows five ends of the satin weave and ten ends of plain weave. However, it is not a complete design, on account of the lack of space. A nice effect can be produced by using about twenty ends satin weave for a stripe effect, and forty ends plain. The plain weave should be reeded two ends in a dent, and the satin



Drafting from Designs.

stripe reeded four ends in a dent. The satin stripe will show up very prominently in the finished cloth on account of being reeded so much closer than the plain weave. In the same manner, a rib or twill weave is often used for producing a stripe, in connection with a plain or fancy weave for the ground, with very pleasing results.

Drawing-in Draft and Harness Chain.

The painted design for a cloth is most useful in that it enables the designer to obtain the necessary drawing-in draft and harness chain draft to be used in producing the design in the fabric on the loom. The drawing-in draft is turned over to the warp preparation department to have the warp properly drawn into the harness ready for the loom. The harness chain draft is handed in to the weave room, where the harness chain for the dobby of the loom is built to weave the desired pattern.

As a general rule, we may say that in making a drawing-in draft from any design, all warp threads that work alike should be drawn in on the same harness. In making the chain draft, we simply copy the interlacing of each warp thread, that is drawn on a different harness. The workings of the harness should be shown consecutively in the harness chain, that is, beginning at the left-hand side of the chain draft, we should indicate the working of harness No. 1, 2, 3, 4, etc.

Design paper is also used for making the drawing-in and chain drafts. The drawing-in draft is usually made by painting in one of the small squares below the design, and by this means indicating that this particular thread is to be drawn in on the harness indicated by the painted-in square. One point which should be particularly noted in making a draw-in draft, is that each row of squares running filling ways or across the design paper, represents one harness. Instead of painting in the drawing-in draft, figures are often used in the squares to indicate the harness.

In order to thoroughly illustrate the work of making a drawing-in draft, Fig. 29 is given. This shows two repeats of the four-harness $\frac{3}{2}$ twill. Directly under the design is the drawing-in draft and at the right is the chain draft or pegging plan. The figures at the left of the drawing-in draft indicate the number of harness. The first thread is drawn in on No. 1 harness; second thread, on No. 2 harness; the third, on No. 3; and the fourth, on No. 4 harness. This is known as a "straight" draw, because no two ends in one repeat of the design work alike, and the threads are drawn in the harness in rotation, from one to four.

In the chain draft shown in Fig. 30, No. 1 harness is indicated to be raised and lowered the same as the warp thread in the design which is drawn through this No. 1 harness. Each succeeding line in the harness chain is built in a similar manner from its respective thread interlacing. The chain draft for every straight drawing-in draft is, therefore, an exact reproduction of one repeat of the design. It is sometimes necessary to make the chain draft repeat itself two or three times in order that the harness chain will be of sufficient length to reach around the chain barrel on the dobby. The four-harness twill in Fig. 29 is an example.

In the same manner, any regular twill or any satin weave is drawn in on a straight draw, because all regular twills and satins have no two ends in one repeat work alike. The harness chain for any one of these weaves will be an exact reproduction of a repeat of the design.

Fig. 31 shows one repeat of a design known as a pointed twill. Directly under the design is shown the drawing-in draft, while the harness chain is shown at Fig. 32. The drawing-in draft for this design is technically called a "point" draw. The first nine threads are drawn in straight. The drawing-in then reverses on the ninth harness and comes back to No. 1 harness, which forms the other reversing point. Each one of the first nine ends in the pattern works differently from any of the others, and for this reason each is necessarily drawn in on a separate harness. The tenth thread works exactly like the eight, and consequently is drawn in on the same harness as the eighth. The eleventh thread works like the seventh, and is drawn on the same harness as the seventh, and so on. As this design is drawn in on nine harness, and the draw is straight from No. 1 harness to No. 9 harness, the chain draft will be the same as the first nine threads in the design. The chain draft is given in Fig. 32. If the drawing-in draft on a point draw begins on the first harness, then it must end on the second harness.

Another important class of drawing-in drafts is called the "broken" draw. Fig. 33 shows one repeat of a design which is produced with a broken drawing-in draft. It

will be noted that the draw is straight, up to and including the sixth harness. The seventh end works like the third, and is drawn on the third harness. The eighth end works like the second and is drawn on the second harness. The ninth end is the same as the first and is drawn on the first harness. The tenth end works like the sixth, the eleventh like the fifth, and the twelfth like the fourth. Here the pattern begins to repeat itself. The chain draft, shown in Fig. 34, is a reproduction of the interlacings of the first six threads in the design, as the pattern is woven on six harness, and the draw is straight on the first six threads.

A "mixed" or "crossed" drawing-in draft forms a class which may be made up of a combination of any of the previous regular drawing-in drafts, or any irregular draft required to produce an irregular weave.

The explanation of the foregoing classes of drawing-in drafts, will give the reader a good idea of the method of making the drawing-in and chain drafts for any design. It is possible to make a number of different patterns from the same drawing-in draft, by simply changing the chain draft to suit the desired design. For instance, with a straight draw on six harness, it is possible to make any one of the six-harness twills, the six-harness irregular satin, and any other effect that can be made on six harness.

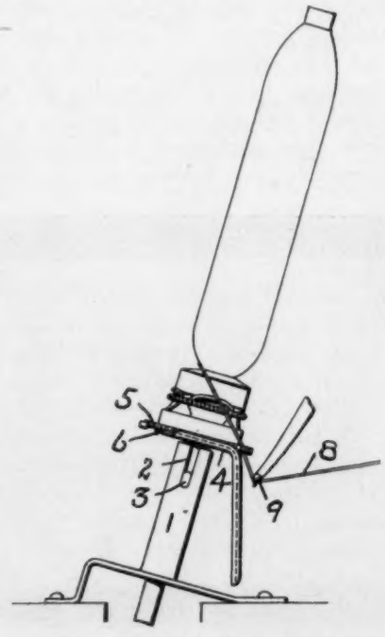
(*To be continued.*)

BOSWELL'S BOBBIN AND YARN HOLDER FOR MULES.

(*Contributed exclusively to* COTTON.)

BY H. A. W.

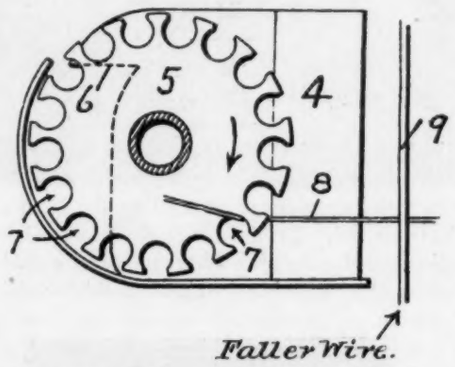
This device is used on mules, spinning either cotton or woolen yarns. The object of the device is to provide means for holding the yarns at the bottom of the spindles while the bobbins or cops are being doffed, and at the same time save making waste yarn, which is generally unavoidable when doffing, owing to the fact that several turns of yarn have to be made on the spindle near the bottom to hold the yarn, in order to be ready to start the mule up directly after doffing.



YARN READY TO BE HELD.

This new attachment obviates the necessity for winding the yarn around the spindle, as it clamps the yarn at a point just below the bobbin or cop and thus only makes one or two inches of yarn waste in the operation of doffing.

The details of the new device are best shown by means of the accompanying illustrations, of which Fig. 1 is a view of a full bobbin on a spindle, showing the faller wire down in its lowest position, holding the yarn ready to be caught by the holder device; and Fig. 2 is a top view of the catcher wheel and plate, used for holding the yarn during doffing.



TOP VIEW OF CATCHER WHEEL AND PLATE.

Referring to the illustrations, 1 represents the base of the holder and has a slot 2 extending down from the top of the base to hold a pin 3 fastened to a barrel which fits into the base and is fastened at the top to a plate 4 which forms the lower clamping piece of the yarn holding device. The pin 3 prevents the plate 4 from turning as is its tendency during the operation of the mule. A spiral spring located inside of the base 1 and pressing upwardly against the barrel of the plate 4, keeps the said plate pressed against a catcher wheel 5. The plate 4 has a portion of its surface cut away, leaving a knife edge at 6, which is used to cut the yarn after the spinning is started up when doffing is completed.

The catcher wheel 5, which revolves with the spindle and bobbin, contains notches 7 on its periphery, which are used to catch the yarn 8 when it is brought down into contact with said catcher wheel 5 by the faller wire 9.

One-half of a revolution of the catcher wheel 5 is sufficient to cause the yarn to be clamped between the plate 4 and the catcher wheel 5, and the yarn is thus held by friction during the doffing of the mule. The clamping space amounts to about one-half inch of yarn. This yarn that is left between the catcher wheel and plate, as soon as the mule is started up, is rolled out through the opening made by having part of the plate cut away as shown, by the revolving of the spindle.

This action of ridding itself of the small length of yarn constitutes a self-cleaning device, prevents accumulation of waste, and insures a proper working of the holder at every doff.

Thus it will be seen that with proper handling, only one and a half inches of yarn per spindle are not wound on the bobbin, and only one-half inch per spindle is wasted, as one inch of the length remains connected to the end on the bobbin; in other words it means practically a saving

of 90 per cent. of the waste due to doffing a mule that is made at the present time.

While it is only necessary to give the spindle one-half of a turn in order to clamp the yarn, as previously mentioned, if through carelessness several turns of yarn are made between the plate and catcher wheel, this yarn will be severed by coming into contact with the knife edge 6, and the waste will be rolled out from under the catcher plate.

This device can be used in connection with any length of spindle in use, as it is adjustable to the length of the spindle.

BRILLIANTS.

(*Contributed exclusively to* COTTON.)

BY SANDERSON W. HAYS.

Brilliants form a class of goods which are always popular when manufactured carefully by weavers who will take the trouble to avoid mispicks when starting the loom after the filling has run out. Brilliants are characterized by small, evenly distributed patterns. They are usually made in filling figures, and when finished white are sold for ladies' dress

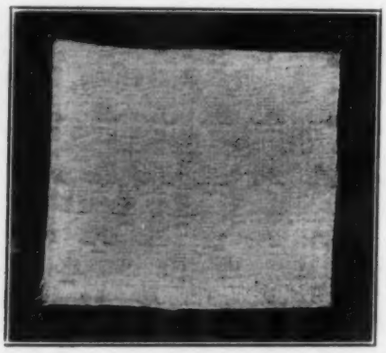


FIG. 1. SAMPLE OF DIAMOND WEAVE EFFECT.

goods and also for men's shirtings. Sometimes the cloth is printed with small polka dots, but large print patterns are never used.

The sample shown in Fig. 1 is a small diamond weave of the point draw order on 13 harness. The cloth has been finished with sufficient pressure on the calender to give a gloss to the filling figure. The complete weave for the design with its drawing-in draft and harness chain is shown in Fig. 2. The cloth shown in Fig. 3 is a small diamond figure of a straight draw of twelve harness. The weave is a fancy twill which produces the effect of small diamonds on diagonal lines. The design and corresponding drafts are shown in Fig. 4. In finishing, this fabric has been subjected to very little pressure and consequently the surface is a dull egg white.

The sample shown in Fig. 5 is a type of brilliant woven for mercerizing and is unfinished, in other words, just as it left the loom. The design for the weave with its drafts is shown in Fig. 6.

For medium grade qualities, the constructions of these cloths are about 68 to 72 ends per inch with warp yarns 32s to 34s. From 40 to 44 picks are used with from 27s to 30s filling. The average weight of the cloth is from 5.75 to 6.00 yards per pound.

For mercerizing, a good construction is 76 ends per inch, 34s warp yarn; and 72 picks per inch of 12s to 13s soft spun filling. The average weight of the cloth will be about three yards per pound. The usual widths are 28 and 32 inches finished.

There are a very large variety of patterns possible on

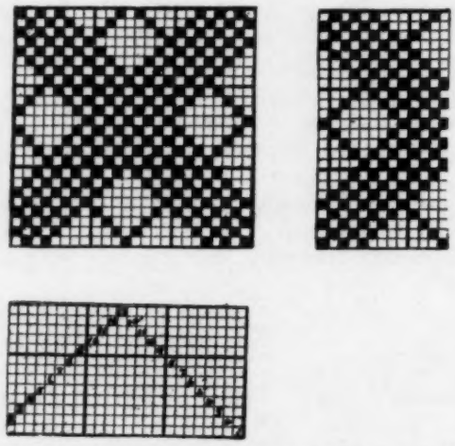


FIG. 2. DESIGN AND DRAFTS FOR FIG. 1.

these brilliants, but unless for some special purpose they must be kept in a space not exceeding one square inch of cloth when made in white cotton.

In ginghams, and in connections with colored ground and stripes, larger patterns may be used, as the higher prices paid for the goods makes it possible for the cutter at the factory for garments to use more care in laying his cloth out for the matching of the different combinations.

HINTS ABOUT COLORED GOODS MANUFACTURE.

(*Contributed exclusively to* COTTON.)

BY J. W. KIRKWOOD.

There are many details and sources of needless expense, which require the attention of a superintendent or manufacturer if a weaving concern is to pay well, and especially in the present state of competition. A well-managed mill should have all of its departments costed, and thus the manufacturer will be in a position to quote his prices for cloth according to his own or his customers sample. Then again he can more readily find any needless waste or expense, and remedy it.

The points to be emphasized in this article are mainly relating to colored goods weaving, but the same ideas are

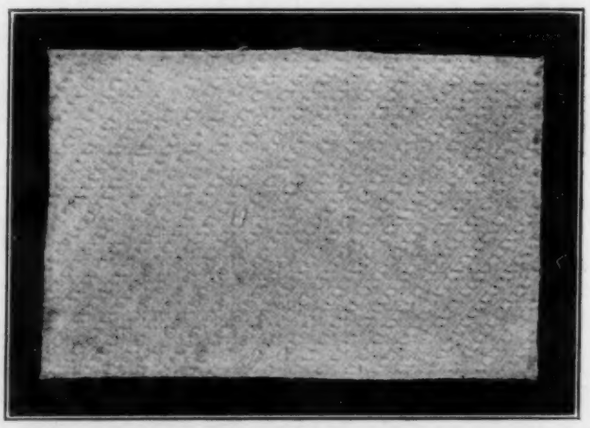


FIG. 3. SAMPLE OF DIAGONAL DIAMOND EFFECT.

applicable in grey goods manufacture. When the colored goods manufacturer, who does not spin his own yarns, receives the same, it is in cop, hank, or warp. The first thing necessary in any case is to ascertain whether it is the correct counts as ordered. Secondly, he must examine the yarn and ascertain if it contains excessive moisture. Thirdly, he must see that the yarn is clean and in good condition. Some manufacturers do not reel their own cops into hanks, but those who do should see that the same are carefully wrapped from 7 or 8 cops and an average taken for the counts.

Excessive waste should be guarded against, the weight of waste, tubes, etc., should be taken from each skip of yarn, so as to get the actual weight of yarn for use. Those who do not reel their own yarn, but receive it in hanks will of course send it to the bleacher or dyer, just the same, and a book should be kept giving the weight of the grey yarn in each delivery, and the difference in weight after bleaching or dyeing. This should be kept for reference, especially if each bundle has to be a certain weight after sizing, so that the percentage of size can be readily ob-

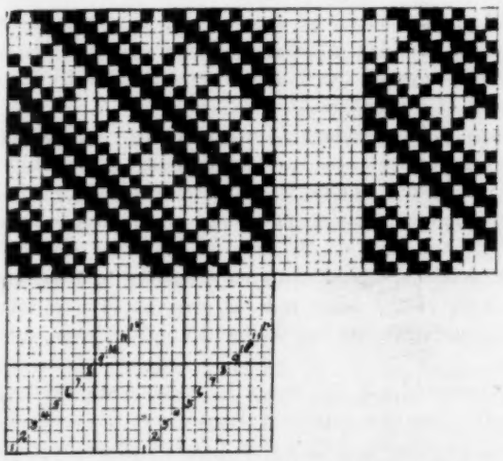


FIG. 4. DESIGN AND DRAFTS FOR FIG. 3.

tained. Some manufacturers have a system of costing monthly, thus: Ingredients used, bundles sized, wages paid, price per bundle for power, which is usually figured at 5 per cent. The white or light colors should be run through the size first, so that the darker colors will not spoil the size, as would otherwise be the case. The heat of the stove or dyeing chamber should be taken each day, and a good decisive heat maintained. If the yarn be over-dried, it becomes very brittle, bad to wind, and the result is excessive waste.

Another record book is also necessary, in which should be kept a report of the amount of yarn wound, the weight of waste made, and the percentage of waste per week.

Calculations as to the hanks per bobbin required for mill or sectional warping must not be reckoned too fine; it is better to have half a hank left on the bobbins after the warps have been made, than to be so much short. By reckoning the hanks too short means creeling a fresh lot of bobbins, which are not always available, this causing loss of time to the warper. When warps are made on sections in the mill machine, it is essential that every care be taken in running the warp on to the weaver's beam, otherwise, slack sides, etc., will cause the weaver trouble and result in bad cloth. With mill warps run through a wraithe in half-beers, there is a danger of having twisted places, which can not be put straight; these are a decided nuisance.

It is necessary that good heddles and reeds should be

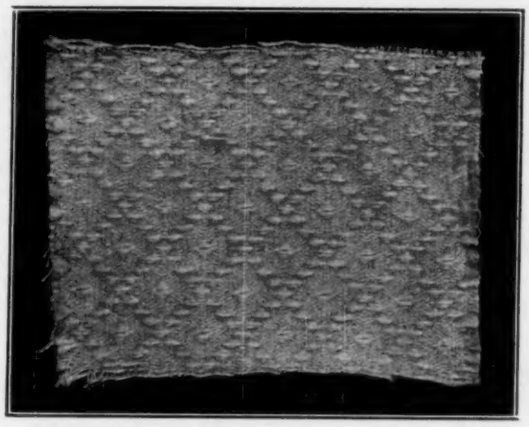


FIG. 5. ANOTHER SAMPLE OF DIAMOND EFFECT.

used, as by the use of poor heddles, breakages are frequent; and poor or strained reeds cause lines in the cloth making it look very unlevel. Another matter of importance is that during all the previous operations the yarn should be kept clean; the free use of paper for this purpose pays for itself. To ensure good cloth, it is necessary to have competent weavers, and skilled loom fixers, for on many occasions a tender or a brittle warp may be made to weave out, due to the ability of the loom fixer to adapt his loom and accessories to each case.

The greatest amount of waste made by weavers is from cops, and in some cases is quite an item. It is caused by the cop being "stabbed" during the shuttling by the weaver. This can be avoided by having long paper tubes in the cops, and as a rule they pay for themselves by reducing the waste item. The waste made by weavers should be kept clean, as this may be sold, thus compensating somewhat for the loss. There may be another kind of waste made, and that is from soft-wound bobbins. These

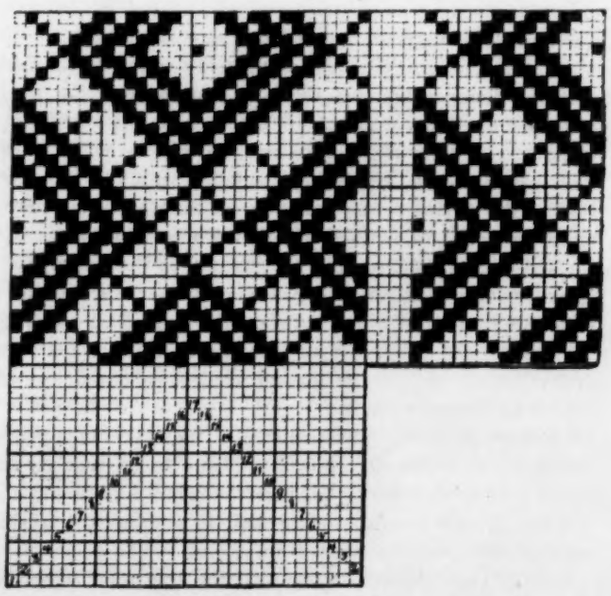


FIG. 6. DESIGN AND DRAFT FOR FIG. 5.

should be rejected by the weaver and sent back to the winding room, for re-winding, otherwise, knocking off will be the result during weaving, causing annoyance to the weaver. These soft bobbins are caused by the winder not having sufficient weight on the yarn to wind the yarn hard on the bobbin.

So far, we have dealt with the yarn in all its stages up to the weaver but it is important also that the loom fixer be provided with good material to repair his looms. Poor shuttles result in chipping off, causing breakage during weaving, but good box wood shuttles are the cheapest in the long run. Overspeeding of looms results in broken picking shafts, cranks, frog tongues, and smashes of various kinds. All this may be avoided by running at a speed to suit the cloth woven, and the width of the loom. A manufacturer who buys and sticks to old looms, will not profit by it. At the present time it is an important matter that machinery should be up-to-date and that every improvement in this direction should be studied with a view to adopting it.

Goods for stock should be stored on racks or shelves. They should be out of contact with the floors, as mildew is liable to set in, especially if heavily sized goods are stored there. Good strong paper should be used in order to keep the goods in good condition. All supplies when received should be examined, weighed, or tested as the case may be. Tallow should be tested for water, and same with oils. Samples of flour, starch, farina and other sizing ingredients should be kept in glass jars marked "samples," and incoming materials should be tested by comparison, for whiteness, consistency, and quality. Shades of colors of various priced yarns should be kept to match in coming yarns for shade, fastness, or whiteness of bleached yarns.

WARP LEASING MECHANISM FOR DRAPER LOOMS.

BY M. R. A.

The object of this mechanism is to provide an arrangement for dividing the warp in a loom, behind the harness, which will be adapted to the loom in connection with the warp stop motion. The necessity for this is due to the fact that the distance between the back harness and the whip roll does not readily admit of having both the warp stop motion and a pair of regular lease rods in this small space. The lease rods are, therefore, combined with the top portion of the warp stop motion, thus making the arrangement more compact and enabling it to be properly located.

The details are best shown by means of the accompanying illustrations, of which Fig. 1 is a transverse section of a sufficient portion of a loom to show the method of applying the mechanism. Fig. 2 is an enlarged front elevation, centrally broken out, of the leasing arrangement and the adjacent stop motion parts.

Referring to the illustrations, 1 indicates an upright stand, there being one erected opposite to another on the other side of the loom, between the whip roll 2 and the harness 3, said stands 1 being used to support the leasing arrangement and the warp stop motion.

Upon each stand 1 is mounted the foot 4 of a casting having a dependent extension 5 porvided with a bearing for a feeler rock-shaft 6, provided with arms for a feeler 7, vibrated under normal conditions by suitable mechanism in the usual manner.

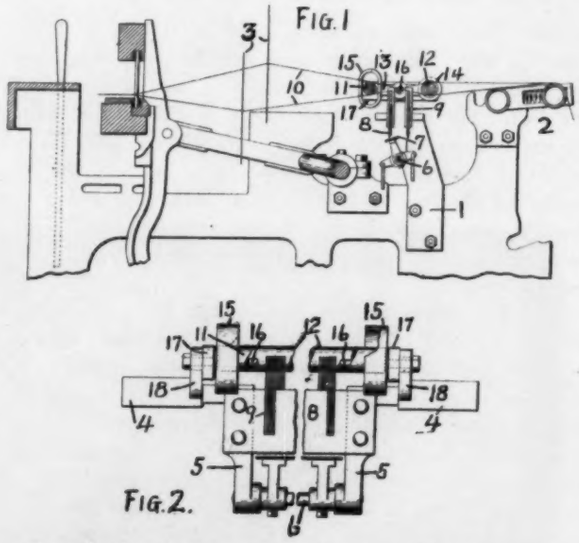
To the front and rear faces of the two opposite extensions 5, are secured upright parallel plates 8 which form guiding means for slotted stop motion detectors 9 shown as arranged in two parallel series and depending upon the warp threads 10, being normally held thereby, above the path of the movement of the feeler 7.

The warp is separated by leasing members, which are cylindrical rods or bars 11 and 12, vertically sustained by the warp, and free to move up and down therewith. The lease rods are located one behind the warp stop motion and the other ahead of it.

The lease rods are movable independently of each other and are free to partake of the up and down movement of the warp, and can accommodate themselves to the leveling action of the warp during the operation of the loom, being in that respect self-adjusting. Means have been provided to retain them in their proper places with relation to the stop motion detectors and the harnesses, while permitting a sufficient amount of freedom to accommodate themselves to changes in the warp movement. To effect this, guide members 13 are provided, one at each side of the loom, having thereon a circular apertured flange 14, and vertically elongated flange 15, the flanges extending laterally from the inside of said members 13.

These guide members 13 are pivotally mounted upon a transverse rod 16, the projecting ends of which extend through and are secured in supports 17, held by nuts; the guide members 13 being positioned on the rod between the supports and nuts on the rods at the inner sides of said guide members. Said supports 17 serve to limit endwise movement of the lease rods 11 and 12, which latter are loosely extended into the flanges 15 and 14 respectively, as shown.

The aperture in the flange 14 is made slightly larger in diameter than the lease rod 12, so that the rod can have some play therein. This rod in practice has more movement than the front rod 11, owing to the motion of the whip roll,



DIAGRAMS SHOWING WARP LEASING MECHANISM.

but as the guide members 13 are pivotally mounted and pracically counter-balanced, they rock as the lease rod 12 moves vertically, without bringing any weight upon the warp.

The front lease rod 11 is practically independent of the guide members and of the vertical movements of the lease rod 12, owing to the play afforded by the elongated flanges 15. The lease rods are thus allowed very considerable freedom of movement, the front lease rod 11 being substantially independent in its movements, while the rear rod 12 not only can move with relation to the guide members 13, but said members can move freely on their pivotal support 16, owing to them being counterbalanced. At the same time the movement of the lease rods in a fore and aft direction is properly limited by the guide members.

The rod 16 extends beneath the warp at the crossing point of the threads and serves as a warp rest between the two series of detectors in the warp stop motion.

Upon each bracket 4 is formed an upright web 18, which is made adjustable by means of vertical slots in it.

By loosening the nuts, the supports can be moved up or down to afford more or less drop of the detectors before engagement by the feeler, and also to change the position of the guide members 13, according to the position of the warp.

WOOL MANUFACTURING.

FINISHING WOOLEN AND WORSTED GOODS.

DIFFERENT DEPARTMENTS IN FINISHING.—WET FINISHING. INSPECTION OR PERCHING.—BURLING. DARNING.

(Contributed exclusively to COTTON.)

BY JOHN F. TIMMERMANN.

The finishing of goods of any description for the market is at once of the utmost importance, not alone to the goods, but also to the previous process necessary to produce the article to be finished. The manufacturers of cotton, woolen, or worsted goods thoroughly appreciate this importance. and for this reason we propose in these articles to treat the subject of "Finishing Woolen and Worsted Goods" in a thorough and comprehensive manner.

The finishing process comprises all the processes and manipulations through which the fabric has to pass from the time it leaves the loom until it has been packed in a case ready for the consumer. In all well regulated establishments the work of finishing is subdivided into two or more distinct departments, generally under the supervision of one head, the "finisher," who divides the work as may suit his individual fancy, with a view to obtaining the best results with the least outlay for labor. As labor is the largest item in the cost of finishing, the larger concerns often think it best to divide the finishing into four distinct departments, each with a specialist in charge, and in this way manage to reduce the actual labor cost to its lowest figure. In the smaller factories this is found to be impossible, so instead of having four different departments the number is reduced to two, with one finisher in charge.

The four departments referred to are the (1) burling and mending, the (2) wet finishing, (3) dry finishing, and (4) packing, but where the number is reduced to two departments, they are termed the wet and the dry finishing, the former absorbing the burling and mending, and the latter the packing. As these several departments are merely the results of circumstances and individual preferences of the management, and have no direct bearing upon the ultimate results, we will in these articles recognize only two departments, namely: the wet and the dry finishing.

Before going into the details of the various processes, it is well to bear in mind the fact that in the finishing department there are no processes which may be slighted with impunity; every one of them has its special mission, and while at times it may be deemed advisable to omit one or the other of these processes, it is not to be supposed that they are of no importance.

INSPECTION.

The wet finishing embraces all the processes that the goods pass through after coming from the loom until they reach the drying process, and the first of these is the proper inspection of the pieces when they come to this department. All goods receive an examination before they leave the weave room; but this usually has no bearing upon the inspection in the finishing department, as it is performed simply for the benefit of the weaver and the weaving department. Therefore, we have to first consider inspection in its relation to the finishing process. Above all things, sufficient light is absolutely necessary. A northeast light is the most desirable, as it is stronger and more penetrating than any other. Extra large windows should be supplied, if possible, for they are of great value and assistance to the inspector, or percher, as he is called.

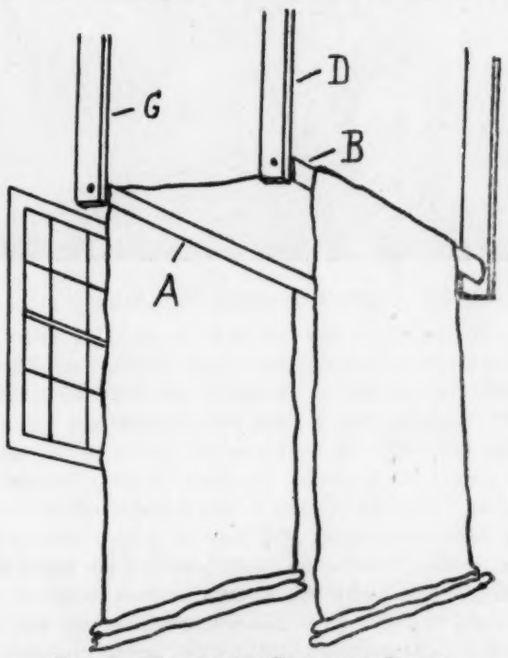


FIG. 1. FRAME FOR PERCHING CLOTH.

Next in order is the perch, as shown in Fig. 1, over which the goods are drawn while making the inspection. This consists of two rolls A and B set in frames C and D about four feet apart, fixed so that the rolls are from seven to seven and a half feet above the floor, squarely in front

of a window, so that the piece which is to be inspected at full width, will receive the full benefit of the light. The piece to be inspected is then pulled slowly over these rolls, and every inch of the surface of the cloth is carefully examined for imperfections.

These imperfections are of various natures, some of them due to inattention of the weaver and others to mechanical defects of the loom, but it matters little what their origin may be; it is the duty of the inspector to find them. When such an imperfect place is found it is marked with chalk in order to call it to the attention of those operatives whose duty it is to darn such places. Fig. 2 shows a sample

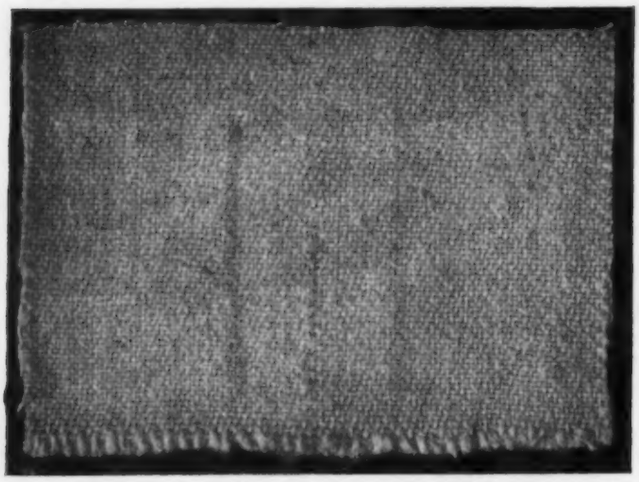


Fig. 2. Defect in Cloth to be Darned.

with a thread out, which requires darning, and shows how the inspector marks the defect. This marking makes it possible for the menders to go ahead with their work, accomplishing much more in a given time than if they had to do the darning and also hunt for the places to be darned. Then again, the inspector has been specially trained for this work, or should be, and is able to determine if a place really needs darning, or if it may be passed without further attention. This is one of the points in his duties where the inspector is easily able to earn his wages for the mill, and more, too. He should also know what can and what can not be successfully mended. The proper judgment of an inspector will often avoid claims from customers, and allowances for inferior goods.

Thus it will be seen that a great deal of responsibility rests upon the inspector, and this position should be filled by a man who can be trusted to do his work conscientiously and thoroughly. It should not be left, as is often the case, to a young person or boy who cares for nothing more than to get in his time in the easiest way he can. It is a great mistake to think that a few cents saved here in the wages by employing an inferior inspector, will reduce the cost of finishing; on the contrary it is apt to largely increase said cost, indirectly, by the resulting claims, etc.

It should be the aim of the manager to have the goods leave the factory in as nearly a perfect state as possible, so as to reduce the number of claims to a minimum. Much of this is directly done at the inspecting of the goods, for if an irresponsible or careless party is intrusted with this work, the chances are that a quantity of imperfect goods will be passed as satisfactory.

The face of the goods is first carefully examined for imperfections and then the piece is again pulled over the perch, and the inspector stands under the two rolls, thus bringing the goods between him and the light, enabling him to catch many imperfections which would otherwise escape his notice. To finish the process of inspecting, the goods are again drawn over the perch, this time exposing the back of the piece for inspection. The importance of the process has thus been sufficiently shown and its details explained, but it must be added that the variety of goods made makes it expedient in many cases to modify the process in order to suit the needs of a particular cloth. Therefore, the description as given above must not be taken as being the rule in all cases. However, as stated before, all places should be properly marked by the inspector and if in his judgment any of them need not or should not be mended, he should have some mark to let the operatives know, without obliging them to leave their work to find out. So, if an imperfection should not or need not be darned, he should mark it like the rest of the imperfections with the addition of a cross mark. This will show the darners or menders that the imperfection has been noted by the inspector but for reasons best known to himself, he has decided not to have them mended. Such a system will save much time, not alone for the menders but also for the inspector.

Fig. 3 shows a sample of cloth containing two defects that can not be mended.

BURLING.

When the inspection of the goods is finished the pieces should be rolled up neatly and placed in a pile ready for the next operation, which is the burling. Neatness is one of the essential points about the finishing room, and it is well to start this at the beginning. A special place should be designated for the pieces, and all be put there in neat shape. The burlers will then know where to go for work and not have to ask questions.

Sometimes there are pieces which it is desired to put through ahead of others and these may be placed in a pile by themselves. It should be so understood by the burlers that whenever there are any pieces at such a place, they are to be given attention before any of the others are touched. Here is another item where much valuable time may be saved to all hands and fewer chances for omission are given. The burlers, of whom usually two work together on a piece, take the piece, carry it to their table, unroll it, and commence operations with the end which contains the ticket, with the back of the piece up. The girl who works on the left side of the table first sews on the number, style, and such other items as the ticket contains. For all practical purposes it is sufficient to have the number and style sewed on the piece, but on this point, as well as many others, individual notions prevail. The proper place to sew the number on the piece, no matter what else is put on or omitted, is by common practice on the back of the piece and on the left hand corner reading from the listing inward. After the number and other information have been sewed on in a manner which will make it easy to decipher them afterwards, the back of the pieces is taken in hand by the burlers, and carefully gone over; and everything which interferes with its smoothness is carefully removed. Too often this is done in a manner which is of no benefit to the goods, therefore it is the duty of the finisher or the one having direct charge of the burling to see that while removing one obstruction to smoothness, another is not cre-

ated. All the knots which have been tied in the threads composing the fabric must not only be looked for but felt for, and carefully drawn to the surface, and cut off. When doing this, the ends should be left sufficiently long, so that after crawling back, as they will in the next process, they will not leave a space in the cloth without a thread. To guard against this, the knots must be drawn to the surface gradually to prevent undue tightening.

All threads left on the back should be cut off and not pulled off, as is often done. Where a thread or end is left on the back without drawing it out, it must be cut close, or else it will form into a lump during the fulling process which follows. All bunches must be drawn out a little at a time, so as not to disturb or strain the surrounding threads. All these things can be done carefully and expeditiously without resorting to promiscuous jerking and pulling, which generally does more harm than good.

As soon as the back of the piece is finished, the face is operated upon. The removal of knots here is attended with even more danger than on the back, but these knots on the face are simply drawn out carefully and left there, to be removed in the shearing process. This is the best plan on account of the spaces left where threads may have crawled back, and which would make it necessary to again mend the finished product. By leaving the knots for the shears to take care of, this trouble is avoided.

One of the greatest troubles met with now and then on the face of the goods is what is termed "runners." This trouble is caused by extra filling being drawn in on the side with a regular pick, from one to five or six inches, so that two extra threads lie on the face in the same shed. These extra threads have to be carefully removed so as not to

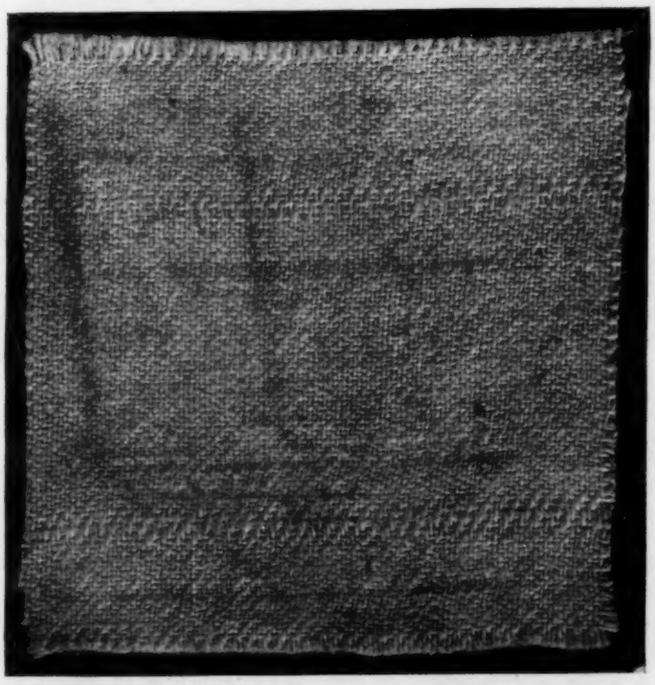


FIG. 3. DEFECTS THAT CAN NOT BE DARNED.

harm the proper threads of the fabric. If at all convenient, this work should only be entrusted to the oldest and most experienced hands, and immediate steps taken to have the recurrence of this trouble stopped in the weaving of the goods. In all other respects the work performed by the burler on the face of the goods is like that done on the back; only on the face a little extra care is required.

We will now consider the tools by which the burling is done. In burling, as in all other work, it is of importance that the tables and tools supplied to the workers should be of the best. This is lost sight of in too many instances. It should be recognized as the first principle of economy in any kind of work, that anything which tends to make the

FIG. 4 BURLING IRONS.

work easier for the operative, also tends to increase the product, and not only that, but it also contributes largely to the quality of the product. Therefore, first of all, the tables used to hold the cloth should be as smooth as possible, so that the burlers, when feeling for knots, may not meet obstructions on the table, which simply creates a loss of time. After a burler has been fooled once or twice by finding, what she supposed to be a knot, to be only some unevenness in the surface of the table, she is apt to become careless and will often pass over what is really a knot, supposing it to be due to the table. Very often, tables are used where the top is made permanent at a certain angle, but such tables should not be used, for the reason that all operatives are not the same size; some have shorter arms than others, and again the eyes of some are stronger than others, and to obtain the most and the best work, these little things should be considered. By having the top of the table on hinges, so that it can be raised or lowered to an angle best suited to the operative, the latter is made comfortable and will work much better. Then, again, when the piece is finished, the top may be let down flat and the piece folded much easier than where the top is at an angle.

Next, the burling irons must be looked after to be in proper condtion for the work. Fig. 4 illustrates an ordinary pair of burling irons. The irons should be ground flat on the sides and come to a sharp, fine point, but not too long. If the sides are ground flat, the edges will cut the threads easily without much strain. They should not be allowed to become too round for as soon as they become round, they are practically useless for burling. Besides having sharp irons, each burler should be supplied with scissors and be made to use them to cut threads, and not pull them off.

When both sides of the cloth have been treated, the the pieces are then nicely folded and placed on the pile ready for the next operation which is the mending or darning. Before placing the piece there, however, the burlers enter the number and style, together with the date, in a book given them for the purpose. This enables the overseer to easily trace any poor work which may have been done and it also serves to show the amount of work performed by the burlers.

DARNING.

The next step in the line of operations is the darning, mending, or sewing in, as it is variously termed. This operation is performed by having the piece pulled over a perch and taking each place which has been marked by

the inspector, and darning or mending it. The threads are sewed into the fabric according to the character of the weave. For this work expert needle women are required, who have good eyes and are good imitators. The pattern being always before the operator, she must study it carefully in order to find how the threads run and then imitate the original weave. The work is tedious in the extreme and very trying to the eyes, but experience soon comes to the aid of the darner, and after a while she is able to put the threads in the right place without much trouble. Of course there are not always experienced workers enough to go around and then new hands will have to be broken in.

Learners should be given the plainest work and easiest patterns and when they are able to do them perfectly, the harder patterns may slowly be introduced. The object of darning, as is evident, is to bring the goods to a state of perfection before they are allowed to proceed further. All darning which is done before the finishing takes place will be less noticeable even if not quite perfectly performed, than it would be if the darning were done after the goods are finished. All the threads thus receive the same treatment in finishing and therefore they will look more alike than if they were inserted afterwards.

When the pieces have been properly darned, they should, if possible, be again inspected to make sure that they are right before going ahead with them. These precautions apply in a peculiar sense to the finer grade of goods, where an allowance for bad work means more than a few cents. However, much of this care would simply be wasted on the lower grades of shoddy goods.

(To be continued.)

KNITTING

THE UNDERWEAR KNITTING MILL.

ORGANIZATION EQUIPMENT, AND MAINTENANCE.

(Contributed exclusively to COTTON.)

BY C. O. TERWILLIGER.

PART I.

In preparing these articles, we have assumed only normal conditions. It is manifestly impossible to go into every detail which would apply to specific cases. However, the writer will be glad to answer, through these columns, any questions pertaining to this subject, which the readers may request. Such questions should be addressed to the Editor Cotton Publishing Co., Atlanta, Ga.

Perhaps the most important subject connected with a knitting mill is that of a proper organization. Some cash, a little knowledge, and the ability to borrow on the manufactured product, make a combination which will permit a mill to be started, but do not ensure its continuance. The third item has been the direct cause of many failures. The goods may have been properly manufactured, and the lender may have had the best of intentions, yet there has been many a mill "sold out" when it could not take up these loans or transfer them. As a hard and fast rule, we state without hesitation, that a mill should be so organized that at all times it will be in a position to take care of these loans or advances. It is far better to keep out of the business than to be subject to this serious disadvantage.

Not long ago we were talking to a gentleman, who for many years has been prominently associated with knitting mills as well as financial institutions, and he stated very emphatically that the main reason why underwear conditions were so subject to "ups and downs" was the fact that the mills could borrow so heavily on their products. It is only necessary to recollect the recent panic with its influence on the underwear trade to substantiate this statement.

The cause of the demand for loans on the manufactured product is due to the length of time the trade expects the mill to carry its account. In the summer season when orders for light-weight underwear are being taken, the mill will carry its product to January 1, 1910, plus a sixty-day dating, and this will possibly cover the early deliveries. In other words, goods manufactured in August will not be paid for within seven months, even providing the mill has the actual orders. Many mills sell spring underwear on a May 1st dating, that is, all goods delivered before March 1, 1910 will be dated May 1, 1910. From this it is easy to understand why knitting mills should be well supplied with working capital.

The next important item of organization is the relative amounts to be invested in building, machinery, and working capital. The desire to see "wheels go round" often sways the otherwise good judgment of the organizer, with the result that the wheels do not go around very long. In most instances it is caused by lack of working capital. We are unable to state just what the relative amounts should be, as such items as good management, classes of goods manufactured, methods of selling, etc., all enter into the subject very materially. For a new mill with no reputation, we advise a sufficient amount of working capital to provide for the full cost of production to the average date of settlement of its product. With this amount at hand, the mill is always in a position to pay its bills and be independent of advances. Of course this means a relatively large capital for the annual amount of business, but after the mill is established, and the organization of help perfected, it is an easy matter to put some of this capital into machinery for a larger production.

Mills very often make arrangements with large consumers to make early settlements, but this is seldom possible with a new mill. A new mill has more or less experimenting to do, which requires much time and money. Again, if the mill is located where there is no skilled labor, the expense of educating is another item not to be ignored. All these things prove that the new mill should be well supplied with working capital.

We will not attempt to describe the best type of building for this industry. We would advise renting, if possible, especially where the mill is to be started in a location not in the underwear centers. After the mill has demonstrated that it is a success, there is time enough to provide a more suitable building. In this connection, we prefer a building with a saw-tooth roof construction, as it affords plenty of light where it is most needed. In some locations

this type is not economical when the cost of the land is a large factor.

Electricity should be used when practicable. This should be arranged so that each department may have its own motor. Unless the mill makes its own yarn, the power required is comparatively small. The modern electric motor requires little care, in fact, as long as it is properly lubricated, it will perform its work steadily, and needs no more attention. In large mills where a great deal of power is required or where steam is necessary for bleaching or dyeing, there is much to be said in favor of the steam plant. This depends however, on the cost of coal in that particular locality. Many of the large cotton mills are using electric power at a cost much lower than would be possible if they had their steam power plant. These mills are located in the vicinity of large water-power developments and are able to get power at a very low figure. The cost of power in an underwear knitting mill is really a secondary consideration in comparison with the cost of labor. We have in mind a representative mill where the expense for power is only ¼ of 1 per cent. of the total cost of production, while the labor cost is 50 per cent. One can well afford to pay for expensive power, providing the labor cost is proportionately reasonable.

We now come to the subject of machinery, and fortunately have an extensive list from which to choose. Above all things remember that the best machinery should be secured.

Knitting machines have a long life, if kept properly repaired. This applies to either the spring or latch needle types. We do not consider second-hand machines a good investment unless you are sure they are in good condition. The element of time that the machine has been used is not always to be considered in purchasing a second-hand machine, because a new machine, if improperly cared for, might be much damaged in a little while. On the other hand, we have seen machines that have been in operation for years and are now in excellent condition.

The above is true of winding machines. All knitters agree that half of the success in knitting is in the winding. This being the case, it is well to provide a good winder at the start, and see that it is kept in good repair at all times.

Sewing machines if kept in repair, will do good work for years. This class of machinery is being constantly improved and what might be the best to-day is out of date in a short time. This is especially true of the button hole and button sewing types. It is really wonderful to see the progress made in this class of machines.

The modern sewing machine is designed to run at a high rate of speed, and while the makers have them well nigh perfect in construction, they should have the best attention. When repairs are required, they should be made in a workmanlike manner. New parts should be obtained from the makers. As a rule home-made parts are a poor investment. We have seen machinists trying to save their employer a fifty cent part, when if the time spent in making the part were used to tighten the bearings, etc., on other machines, the employer would be saved dollars. The subject of the care of sewing machines is of much importance and will be left for another article.

We must now select a foreman for each of the several departments, providing the mill is a large one. In the smaller mills one foreman is often engaged to oversee two or more departments. Taking the different positions in their natural order, we must consider the requirements of the boss knitter. In the knitting of underwear, the mill's profit or loss is often determined by this factor, and it is very necessary to employ a man who is not only a skillful fixer, but is also a good manager of help. In the large mills, the foreman seldom adjusts the machines; this work being the duty of the second hand. With this arrangement, the foreman has the entire department under his direct supervision, and it is his duty to see that the winding and knitting machines are kept in good order, and that they are making good cloth. He must personally engage all the help for this department and see that the machines are kept in operation. An indication of a smooth running room is to see the fixers and knitter tenders with spare time and the machines all turning. This is first-class evidence that the machines are in good condition, because when a fixer is tinkering with a machine, or a knitter tender is putting in needles, etc., that machine is not producing.

A first-class boss knitter is and always has been a scarce article. If a new mill is able to secure the services of such a man without trying a dozen men in the position, it is indeed fortunate. Often a man is a good handler of help, but is not proficient in the actual knitting. While the fixer is expected to make the ordinary adjustments, the foreman must be able to do this work and also to make some adjustments which the fixer may not be able to do. On the other hand, we have met foremen who were bright and could run the machines themselves, but were unable to handle the help properly to keep a large number of machines in constant operation. In the latter case, it is a matter of the man's personality which can seldom be taught him, but in the former case, there is little excuse for inefficiency. We think that knitters are educated too much along narrow lines, their knowledge being mostly obtained by constant employment in the knitting room. This means that they absorb only the ideas of that particular mill in which they are employed. This process of advancement is very slow and most discouraging.

The textile schools have taken up this subject in a most progressive manner and we believe it will not be many years before men educated in these schools will have the preference. They are given a good technical training under efficient instructors and are taught to set up and operate the several types of knitting machines. We understand this is supplemented with lectures by practical knitters who are experts. Naturally the students get the different ideas of capable men in this line. Of course the conditions in the textile schools are most ideal, and are quite unlike what one may find in many mills, but experience in the mill soon perfects this seeming fault in a comparatively short time.

The textile school should appeal to the young man who desires to be a knitter, for here in the course of a few years he is not only able to get a good knowledge of knitting, but also can learn much of the subsequent operations in the knitting mill. Under the old regime, knitters were divided into two classes, namely, ribb and flat; and it is not often you find a man who is an expert in both. This is because the man has grown up in a mill making the one class of goods, or if it made both, he only had a chance to grow up with one style. In the textile school the student may learn to adjust and operate all classes of knitting machines. We make special comment on the work carried on by these

schools, for we believe that through them we will get more efficient knitters.

Our next department is the finishing room. Here the particular individuality of the foreman or forelady is shown more or less in the finished product. His first requirement must be to handle both male and female help. To this must be added a natural aptitude for the finishing of garments. While not absolutely necessary his ability to operate the several kinds of sewing machines is an advantage. He must, however, know when these machines are running properly, and be able to tell at a glance whether defective work is the fault of the operator or the machine. He should be able to discern when the machines should be over-hauled, and advise with the sewing machine fixer.

This position at the best is most nerve trying, and for this reason competent men are few. In the very large mills one foreman has charge of each department, which makes the position easier to fill. When this is done it is customary to have one head foreman who is responsible for the work of the others. This ideal arrangement is only possible with the largest mills, and as they are in the minority, we will take up the conditions in the smaller mills.

The foreman has the supervision of from five to twenty separate and distinct operations, each one of which is very important. As one man has termed it; "He must be father, teacher, and driver of a few hundred boys and girls." Here the individuality of the man is seen. He can either make his department pleasant to work in, or he can make it almost unbearable. The trials and tribulations of this man in a new mill located outside of the knitting centers would fill a book. We mention these things that the importance of this position may be fully appreciated.

It requires many months to learn some of the operations in this department. The education of this help is an expense to the mill; and in order to keep the learner until she becomes useful, requires diplomacy on the part of the foreman. As an instance, we cite the case of a girl learning to loop. This is one of the most difficult operations to learn. One can not expect a girl to work for nothing while she is learning, as it is some time before she can earn anything if paid by the piece. It is therefore necessary to pay her something while she is learning. Suppose now she has been paid for several weeks and then gets discouraged and wants to leave. If the foreman is unable to persuade her to stay, the amount that has been paid her is a total loss to the mill. If, however, through his personality he can get her to remain, the mill will, in time, have an experienced operator and will be repaid for the money spent in teaching her.

A good foreman will command the respect of those under him and will seldom have any serious disturbances. Some men are always having stikes to settle and a general discontented feeling to combat. We have seen mills in the same locality, paying the same prices for the work where one of the mills would usually have trouble in keeping the help, while the others were operating smoothly. In this case we had a personal knowledge of the situation and knew it was all the fault of the foreman.

(To be continued.)

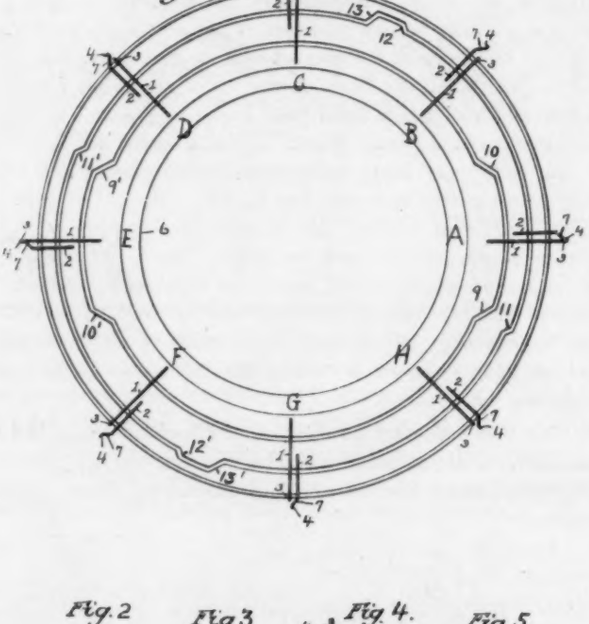
AN IMPROVED KNITTING MACHINE.

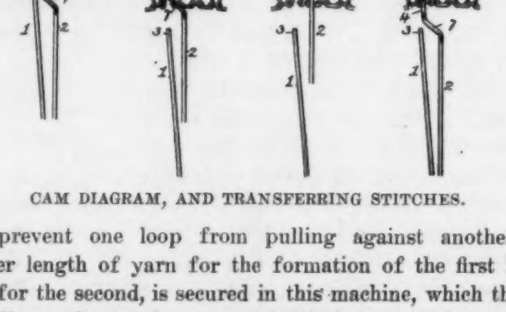
BY H. A. W.

This machine is used for the production of that type of fabric in which sinker wale loops of successive courses are transferred either into an adjoining needle wale or into needle wales on each side of the sinker wale.

Fig. 1 is an inverted plan view of the cam ring which operates the transfer needles or points. Figs. 2, 3, 4, and 5 are diagrams, illustrating the operation of the machine in transferring the sinker wale loops to an adjoining needle wale.

In order to have an even tension on all of the loops,





CAM DIAGRAM, AND TRANSFERRING STITCHES.

and prevent one loop from pulling against another, a greater length of yarn for the formation of the first loop than for the second, is secured in this machine, which thereby relieves the tension upon the first loop and prevents the slackening of the succeeding loop. In order to effect this result a pair of transfer points, 1 and 2, is employed wherever a transfer is to be effected. The point 1 has the yarn receiving portion 3 of greater depth than the yarn-receiving portion 4 of the other point.

The yarn for forming the first loop of the pair of loops to be transferred is applied to both points 1 and 2, as shown in Fig. 2; but before reaching the next yarn feed, the point 1 is withdrawn from under this first yarn, whereby the yarn for forming the second loop is applied only to the reduced portion 4 of the point 2, as shown in Fig. 3. The second loop is consequently shorter than the first, but is long enough to compensate for the carrying forward of the course from which it was drawn; whereby both of the transferred loops may be under corresponding tension and no robbing and consequent shortening of the stitches of adjoining needle wales will take place. Neither will there be any tendency to draw the needle wales toward each

other, nor to slacken the upper loop and the stitches adjacent thereto. Consequently unobstructed eyelet holes of full area will be produced.

The point 1 consists simply of a straight bar with a butt for the action of the cams in the dial cap 6; whereby said point is projected and retracted.

The transfer point 2 has the inclined member 7; and when said point 2 is projected as shown in Fig. 4, the sinker wale loops hanging upon the same will be deflected laterally into position for engagement with the adjoining needles 8. The point 2 is then retracted, as shown in Fig. 5, after the needle 8 has properly engaged the loops.

As the movements of the point 1 are different from the movements of the point 2, independent cams are employed for operating each point as shown in Fig. 1.

The cams 9, and 9′ are the projecting cams for the points 1, and the cams 10 and 10′ the retracting cams for said points. The cams 11 and 11′ are for effecting the initial projection of the points 2 to position for receiving the sinker wale loops; the cams 12 and 12′ those intended for effecting the final or transfer projection of said points; and the cams 13 and 13′ those for effecting the retraction of the points 2 after the transfer.

The cam ring shown is intended for use in connection with an eight-feed machine, both points being projected to the loop-receiving position at the feeds A and E; the points 1 being retracted at the feeds B and F; and the points 2 being further projected after passing the feeds B and F in order to transfer their loops to the adjoining needle. Both sets of points are retracted at the feeds C and D, and G and H, in order to provide for the formation of plain courses of stitches between the courses in which the eyelet holes are formed. There may be as many of these intervening feeds as the number of such plain courses to be produced.

In Fig. 1 one pair of transfer points is shown at each feed, but in operating the machine, the transfer points will be located wherever it is desired to produce eyelet holes in the web.

The vertical needles are mounted to reciprocate in a cylinder, and are operated by cams in a cam ring; while the transfer points are mounted to reciprocate radially in a dial and are operated by cams in the dial cap 6, as shown.

DYEING, BLEACHING AND FINISHING

AN IMPROVED METHOD OF DYEING UNION GOODS.

(Contributed exclusively to COTTON.)

BY H. A. W.

It has been found that by treatment of wool with chromium compounds, its affinity for sulphur colors is considerably reduced, and further that the wool loses almost completely its affinity for sulphur colors, if instead of a treatment with chromium compounds alone, it is subjected to a treatment with formic aldehyde and chromium compounds.

When dyeing a union fabric with sulphur colors, in which the wool has been treated as mentioned above, the cotton in the fabric takes the dye, while the wool will remain practically white. It may be afterwards dyed with some suitable dye, if desired. To produce mixed colored effects, the wool may be first dyed and treated as explained above, before spinning or weaving with the cotton, in which case its color is unaltered when the cotton is dyed with a sulphur color.

For dyeing with sulphur colors, it is advisable to employ a method which does not impair the strength of the wool fiber. This is best accomplished by using a dyebath containing the sulphur dye, sodium sulphide, and salts of organic acids possessing a reducing action, such as formic acid, lactic acid, etc.

When such a dye bath is employed for dyeing union goods, the wool fiber in the cloth is not injured, and further the lactic acid in the dyebath adds to the power of the formaldehyde and chromium compound, which these substances exert in protecting the wool fiber from being dyed by the sulphur color.

The process is carried out as follows: The wool is treated at about 140 degrees Fahrenheit in a bath containing one per cent. of formic aldehyde and 0.15 per cent. of potassium bichromate. It is then either spun or interwoven with cotton according to whether the raw wool or yarn was treated. The union fabric is then dyed in a dyebath charged per 1¾ pints of water, with .28 oz. of Katigen black TW extra, .28 oz. of crystallized sodium sulphide, .18 oz. of calcined soda, 1.06 oz. of common salt, and .05 pint of the acid sodium salt of lactic acid. The goods are entered at about 70-80 degrees Fahrenheit and dyed for from 1 to 1¼ hours at this temperature, rinsed in water, and then in a dilute acetic acid solution. Instead of treating the wool fiber previous to weaving, it can be treated after having been interwoven with cotton. In both cases black cotton cloth with white effects is obtained.

Instead of bichromate of potassium, other suitable chromium compounds, such as chromium fluoride may be used. The treatment with chromium compounds and with formaldehyde can also be done in two different operations.

To obtain mixed colored effects, the wools treated with formic aldehyde and the chromium compounds, either before or after being dyed with suitable coloring matters, such as anthracene yellow C, acid anthracene red 3B, benzo fast red FC, brilliant wool blue B extra, alkali fast green 3G extra. The dyeing of the wool, and treatment with formaldehyde and chromium compounds may be done either before the spinning, or weaving with cotton, or after; but in the latter case it must take place before the dyeing with the sulphur coloring-matters. If, however, the wool has been treated with formaldehyde and chromium compounds, the mixed fabrics can be dyed first with sulphur coloring-matters and afterwards with suitable wool dyes. Variegated effects can be obtained by using wool dyed in different colors. If the dyeing of the wool precedes that of the cotton, care must be taken to select only such dyestuffs, which are not affected by the chemicals necessary for dyeing the cotton.

OCCURRENCE AND REMOVAL OF STAINS ON COTTON GOODS.

HYDROCARBON SOLVENT. OLIVE OIL. COTTONSEED OIL. CAUSTIC SODA. SOAP. OIL STAINS. RUST STAINS. WOOD STAINS.

BY JOSEPH H. HART, PH.D.

From the standpoint of the bleacher and the manufacturer of cotton goods of all kinds, there is hardly anything more disheartening than the occurrence of stains occasioned by a mineral oil or other cause, and although many efforts have been made from time to time to devise suitable means to remove the stains that are visible, yet the fact remains that at the present time we do not possess a process that is equally applicable to all classes of fabrics.

There are many instances familiar to manufacturers and jobbers where goods after leaving the finishing room give every evidence of perfection and apparent freedom from oil spots, and yet, at a later date, unpleasant stains are painfully prominent, which seem to be developed while the goods are in transit or in subsequent storage.

When unfinished fabrics, containing oil stains in any form, are stored for an indefinite time and then subjected to the singeing process, the high temperature of the process tends to fix the oil in the fibers, so that their removal is a matter of some difficulty. Small stains of oil alone may be removed from fabrics by the liberal use of hydro-carbon solvent, such as benzine or gasoline, or with the now well-known carbon tetrachloride, which has very largely come into use as a grease solvent in preference to benzine, on account of its absolute safety from an insurance standpoint, as it is quite non-inflammable.

A good method to adopt in seeking to remove a mineral oil stain from a fabric is to soak the stained area thoroughly with olive oil or cottonseed oil, and then to subject the goods to a light boil in a weak caustic soda solution for several hours; followed by a thorough rinsing. Where small stains occur, or where, as frequently happens, innumerable spots appear on the fabric, due to oil spattered from a belt or rapidly revolving wheel, such spots, as a general rule, contain fine particles of metal which become so closely lodged in the interstices of the fabric that it is absolutely impossible to wash them out with soap, or to remove them with solvents mentioned.

The use of soap as an agent for the removal of stains is not to be wholly recommended; but caustic soda for cotton goods yields results that are much better, especially when a small amount of clear rosin is added to the boil, the reason for this addition being that it aids very materially in emulsifying the fatty and waxy constituents natural to the cotton. Since the introduction and greatly increasing use of the soluble oils, their uses have materially lessened the labor of removing oil stains in general from all classes of goods. Prolonged boiling with the use of soluble oil is not necessary, a steeping in a weak solution heated to about 150 degrees Fahrenheit being quite sufficient.

From a bleacher's standpoint, stains of this character are permanent. Finely divided metal, such as is referred to above, lodged in the fabric with lubricating oil, has been removed with the aid of weak acid solvents, but it is needless to remark that, though the stain was removed, the fabric itself suffered somewhat from loss of strength. One thing should be generally remembered in regard to the removal of oil stains, and that is that an oil consisting of equal parts of olive oil or lard oil and twenty-eight degrees paraffine oil can be removed with less difficulty than an oil consisting of equal parts of an olein oil and a paraffine oil.

Iron stains have at various times been confused with oil stains, but the former are very easily distinguished from the latter by the use of very dilute hydrochloric acid, followed by thorough washing in plenty of water. Iron stains, upon a large scale, have in this manner been removed; but it is a practice which, if adopted, must be carried out quickly, on account of the possible injury to the goods by the acid. Rust stains are generally traceable to iron rust on the inside of the kier, which is rubbed off during the plaiting down, and are difficult to remove, as is also the stain not infrequently made by thoughtlessly turning on the water that has been standing some time in an iron service pipe. If the stains appear to be very slight, the best remedy is to give them a second chemicing and souring, while, should they be heavy, even the usual soda ash boil may not reduce them.

Stains due to the use of old and rotten wood in fixtures about the bleach works, as in trucks, racks, etc., are hard to remove by any means other than reboiling, and when such old timber is in such places as to come accidentally in contact with wet goods, it should be at once removed.

Summing up the subject of stains, the two most important, from a bleacher's point of view, are the iron stains which may originate even during the bleaching process; and the oil stains, both visible and invisible that may be on the yarn even before it is woven. There is no doubt that, if the mills would use vegetable oil instead of the usual line of petroleum products for goods to be bleached, and would encase, wherever possible, parts of loomes, etc., and protect the cloth also from the possibility of oil drops from the floor above; the percentage of trouble from such causes would be very materially reduced.

In the removal of stains, the question of good soaps should never be overlooked. A good, well made tallow soap should always have the preference over a yellow soap with or without rosin, and certainly over soaps made of greases of uncertain origin.

Many stains upon broad goods and laces can be traced directly to the short time the dyer is permitted to handle them. It is a mistake to presume that all classes of textiles can be treated in the same space of time; and unless the bleacher, by the use of sufficient time, is permitted to remove the waxy and the other matters contained in the cotton, stains will appear at a later period, which can then be removed only by means of harsh treatment; and then, perhaps, not completely.

By boiling the goods a short time in the kier, surface oil only is removed, while prolonged action of the caustic lye, under the combined influence of a little rosin and steam pressure, should be thorough in its action, leaving the goods sweet and clean.

From time to time it is announced that someone has at last discovered a process for successfully removing oil stains, and at one time it was believed that the so-called aniline oil method had solved the problem, but in the laboratory it was abandoned as being impracticable.

Cement companies used about 8,000,000 yards of cotton bagging annually.

Cotton cloth has taken the place of wall paper in thousands of modern homes.

WINNING LETTERS IN THE PRIZE CONTEST

THE PRIZE CONTEST WINNERS.

The letter contest for prizes aggregating $100 in cash, which was announced in August, closed on October 15 and all letters bearing post-mark of that date were admitted. Letters came from every part of the country, but the majority of the contestants live in the South. Inquiries concerning the rules of the contest were received by COTTON from practically every State of the United States, where textiles are manufactured, from Canada, and from Europe. Many of these inquiries came too late to make competition possible by the writers.

The letters for the contest were written by mill owners, managers, superintendents, and overseers. Many letters show the most painstaking effort, the result of hours of calculation and research. The letters, as a whole, are of the highest possible character as indicated by those heretofore printed and those appearing in this issue. Owing to this fact the decision has involved great care and labor on the part of the judges of the contest. The judges, Professors Nelson and Camp and the editor of COTTON, passed judgment without knowledge of the names of the writers. Each letter was given a number when it was received, and a typewritten copy made without the name of the writer appearing on the sheet. A copy of each letter thus prepared, was turned over to the judges for their consideration. With the exception of COTTON'S editor, the judges will have no knowledge of the names of the writers of the letters they chose as winning until they read this notice.

The prize winners are as follows:

FIRST PRIZE $50 .....J. H. Stillwell, Gastonia, N. C.
SECOND PRIZE $25 ..... A. S. Dalton, Alabama City, Ala.
PRIZE OF $5 .....C. L. Harris, Newberry, S. C.
PRIZE OF $5 .....W. P. Hurt, Trenton, Tenn.
PRIZE OF $5 .....James Garvin, Lowell, Mass.
PRIZE OF $5 .....R. L. Stevens, Columbus, Ga.
PRIZE OF $5 .....H. G. Smith, Converse, S. C.

Checks for the several amounts were mailed to the respective winners on October 25th.

COTTON regrets that it was impossible to have each letter a prize winner, for there are few of all those received that fail to show a thorough understanding of the subject discussed and the exceptional ability and knowledge of the writer.

The limitations of our space make it impossible to print all letters received, but a number in addition to those already printed will appear in future issues. It has been most refreshing to read those broad-minded liberal and tolerant letters discussing the social conditions of the mill. In not one has there been a suggestion of unfair treatment or of unpleasant relations whether the letter came from a manager or an overseer.

The opinions of the judges are not infallible; all have had long experience in the examination of manuscripts. The marked excellence of many letters made the decisions very difficult, and there will doubtless be readers who will not concur in the judges opinion but everyone has the privilege of his own opinion. COTTON hopes, that inasmuch as all letters could not win prizes, that the writers of the many others which came so close will have derived much profit from the time, thought and care expended. Then, too, the new contest announced in the advertising pages of this issue offer a further opportunity. The editor regrets that the modesty of the contestants led them to request us not to publish their names when printing their letters because so many of them are productions of which any one may have justifiable pride in being known as the writer.

THE SPINNING ROOM.

(FIRST PRIZE WINNER.)

BY J. H. STILLWELL, GASTONIA, N. C.

Weak yarn is one of our greatest troubles and a bad spinning frame causes poor running work which all spinners try to avoid. Weak yarn is mostly caused from bad cotton, but a majority of spinners blame the carder with it. Yarn can be twisted until it is brittle and has no stretch about it, but will not break until it is subjected to a strain. Sometimes the mill will try to spin too fine a number of yarn for the staple of cotton used, thus causing weak yarn and bad running work. We mostly have ordinary cotton, and the writer believes from experience with this staple that number 30s is about the limit for warp yarn that should be spun.

The writer does not think that the draft should exceed 12 or at the most 13. We are aware that this draft is exceeded, but I think spinners will agree with me that when this number is exceeded, the frame will not run satisfactorily. This draft is for double roving. With single roving, experience teaches that the draft should not exceed 8. When quite young, I was running a section in a large South Carolina mill and there was a general discussion as to which was the proper thing; single or double roving. But now every spinner who has run both will not hesitate to say that they do not want single roving on finer than 20s yarn. Excessive speed of a spinning frame will not make the company anything in the end.It causes the work to run badly; makes a lot of waste; works the spinner harder; causes the travelers to run badly and all spinners know that it wears the rings out quickly.

Worn travelers and high speed, causing the yarn to lash the separators, weaken the yarn and make thick and thin places. A point on travelers for spinning fine yarn is that it is not necessary to change travelers; they will come off as soon as worn. Coarse yarn travelers should be changed when worn, as they are liable to make bad yarn and almost sure to make bad running work. When the work runs bad, we make bad yarn because when the ends are pieced by the spinner, a flaw in the thread is generally made.

When changing travelers it should not be done by doffer boys; they have not the judgment and do not exercise the care that should be taken. When it is done, the overseer should stay near by and see that nothing is used to knock the travelers onto the rings. When necessary they should be taken off with an awl to keep from ruining the ring. Assuming that the roving is good, I believe that the most general cause of bad running work are the top rolls.

They may be worn until not level or fluted; they may need oil or need cleaning by having the waste taken out from under the saddle or out of the end of the roller cap bar. It is not advisable to use a roll after it causes an end to break. The back top rolls should never be changed to the front. Good rolls should be kept in back as well as front.

The bearings of the steel rollers should be oiled often. We can not specify a general rule as to the frequency of oiling them, for it should be done according to the speed of the rollers. The ends of the top leather roller do not need oiling after the frame has been running about three months; but only when a new one is put in. The overseer should not depend upon any one to see that the top rolls are properly cleaned twice in 12 hours. It should be done if something else had to be left undone. When oiling the center bearings of the top rolls, there should be plenty of time taken and they should be properly oiled at least once in 12 hours. Some saddles have wicks in them, which is a very good thing, but for fear the oil does not get to the rolls, put a small sponge on the spout of an oiler and touch it to the running roller just under the saddle.

Oiling the spindles should be done once a week, but if we were sure they were all oiled properly, once in two weeks would do, but to oil once a week puts us on the safe side. We should have a very careful man to oil our spindles for that is the costly part of a frame. Have a box made so the man can sit comfortable, and you will surely get better results. There are a lot of spindles not properly set that is, the machine erectors do not do this to most spinners' notions. They run the ring rail half up and set the spindles to rings at that point. We know that is not the right way. They should first be set when the rail is near the bottom of the traverse top, and if the spindles are not in the center of their respective rings they are not plumb. Those out of plumb should be papered up until they are in the center of the rings. Then run the rail back to the bottom and see that the spindles are still in the center. Spindles and rings should be set once a year without fail.

Slack bands give everybody trouble who has anything to do with the yarn. Bands made of roving will give good satisfaction, and tend to keep down some of the trouble. They don't stretch like twisted yarn bands. A worn bobbin is very little thought of, but if one does not fit the the spindle it makes trouble all over the mill; the spinner can not keep up the end, and it makes slack yarn. A guide wire that is worn must be taken out before anything can be done satisfactorily with the end. To set the guide wires, they should be plumb over the respective spindles. The latest improved Whitin guide can not be moved by the spinner without a wrench. In looking after the guide wires we will find different things that cause them to be out of plumb. Sometimes the bolsters of the spindles are worn; sometimes the bolster pin is worn off and again some bolster cases have the top worn.

A bad ring may be used for a time, but it is only a loss to the company. It will soon throw off enough travelers to pay for a new ring; besides this, every time a traveler comes off it makes waste and a weak place in the yarn or a lump. Some overseers claim that a traveler bears on a very small portion of the ring, and that it will keep the ring clean. This is a mistake. The rings should be cleaned occasionally. If uneven yarn is being made on some frame in the room, examine all draft gears as one or more teeth may be broken out. The gear may not be set deep enough and will slip a little sometime. On a worn frame the gear must be just right or it will jump a little and cause cut yarn. Cockled and lumpy yarns are made from different causes. Sometimes it is bad piecing, dry rolls, dirty cleaners, or dirty scavenger rolls. Lumps will sometimes get into roving by having a longer staple bale of cotton get in our mixing than the frames are set for. A good plan is to get our rolls set properly for the staple of cotton we have, and then take out our back saddles and close up our rolls a little; we don't find much cockled yarn then. The weight hook may get down on the back board, and cause lumpy yarn and thick and thin places.

Do not have anything fanned off in the spinning room. We know it is liable to catch in the yarn and twist in, and make bunches and lumps. Spinning ends that are running badly should have everything looked after immediately. Size and see that the number of yarn is all right; take bobbins from the carder and size from them twice a day. The number is not likely to get off then. If it should not weigh right the first time, do not change the draft gear right away for sometimes it may be off then come up all right. These changes will make several different numbers of yarn.

RULES FOR SLASHING.

(Second Prize Winner.)

BY A. S. DALTON, ALABAMA CITY, ALA.

First, place the required number of section beams in the frame, so that they will pull under the beams on the bottom row and over the beams on the top row; then see that all the beams are in line.

Second, arrange the weights on the frictions on the first and third beams from the back. You should have two sizes of weights to use: one twice the size of the other, and when the set is half out, take off the heavy and put on the light weights. A set should not under any circumstances be run out with the weights you start with.

Third, pull the warp over until all beams are even and straight; then put in tape or lease strings having them double.

Fourth, pick the lease strings about 20 inches from the comb; this saves warp which means money saved for the company. Be sure to pick lease even and you will make a smooth beam.

Fifth, put in the lease rods.

Sixth, place loom beams in head and wind the comb in or out to correspond with beam head.

Seventh, now you are ready to start the frame. Wind the mush roller down within one inch of the bottom of the box, then run in the size to within one-half inch of the top of mush roller. Now turn on steam enough to keep the size boiling gently while running.

Eighth, see that the slack roller is in place and see that the flannel on the squeeze roller is in good condition. Start up the slasher on slow speed, and blow out the cylinders to let the cold air out so that dry steam may take its place. You must be governed by the width of the warp as to how much steam pressure to use. On starting in the morning, when the cylinders are cold, turn on more steam than is required to dry the yarn and run with this for 15 or 20 minutes or until the cylinders are hot, then reduce the pressure to just enough to dry the

warp. Too much steam pressure will bake the size on the warp and cause it to be brittle.

Ninth, see that the drain pipes work all right and don't let water accumulate in the cylinders as it would make it impossible to dry the warp properly, besides being more or less dangerous. It is a safe plan to stop your frame each night with the valves in the cylinder head on bottom and leave them open.

Tenth, when you have found out just how much steam pressure it takes to dry your warp, then set your pop-off valve at that pressure. The valve will stick when cold, so it is a very good plan when starting to raise it to see that it is not stuck. Be sure to watch your reducing valve and see that it works properly. Now start on faster speed and watch everything closely for some time after starting; feel the warp behind the lease rods to see if the size is all right. Watch carefully to see if your warp is drying properly.

Eleventh, see that the proper amount of cloth is on the tension rollers in front. See that they pull uniformly with the rolls in size. If there is not cloth enough on the front rolls, the warp will slip on the cylinders. Be careful not to put on too much, as it will cause the rolls to pull the yarn too fast, and thus pull all the stretch out of the yarn. Watch your friction in front and see that it does not pull any of the stretch out of the yarn between the tension roller and the beam.

Twelfth, see that your press roller is perfectly round and smooth. Notice it every few days, as handling it in changing a set sometimes causes a small burr on the end and if not noticed will damage a number of warps by the rough end cutting the yarn. Be careful that the weight on the press roller is not too heavy because if it is your beam will be too hard. Regulate the press roller and head friction so that when your beam is full you can make an impression on it with your knuckle.

Thirteenth, don't forget that the main art in running a slasher is to know how to keep all the frictions regulated perfectly. Watch your friction on the section beams; watch your friction on tension roller; and watch your friction in front.

Fourteenth, be careful to look over your frame often to see that all the nuts and set screws are tight and especially keep all set screws tight that hold the gears on shaft and tension rollers. Notice carefully and keep your lease straight in case you have a break down. Take a new lease in case of bad warping and laps. A first-class slasher tender never cuts a lap while the frame is on fast speed.

When stopping to doff a warp beam, don't let your frame stand any longer than possible, because if you do, it will make a roller mark in your warp which will give trouble in the weave room and sometimes they have to be cut out and sent back on the slasher man. This means more warp waste charged up to him besides the money the company loses. If you are going to work for a mill, work to their interest; if not, quit and don't cause them to lose money. Always do unto others as you would like for them to do unto you. Sometimes the warp will slack and twist some between size box and cylinders, so that it will be best to run on slow speed until this slack and twisted part has passed the lease rods.

When stopping at noon or at night, wind the mush roller up out of the size box, stop the slasher, cut the steam off from the cylinder and size box, raise sponge roller first, then raise tension roller and slip the belt on the tight pulley and off as quickly as possible. This is done to take all the slack out of the yarn.

Be careful to notice around the squeeze roller and when cutting a lap off of said roller, stop the frame then cut it off carefully, as you are liable to snag the flannel. A small defect in the flannel on either the squeeze or tension roller will do a great deal of damage.

Before starting up in the morning first draw off the bottom of your size which you will find to be very thin, then skim your size and boil what remains, using a soft wood paddle to stir around the edges and in the corners while boiling, being careful to get all the lumps off the bottom. After the size has boiled, let the mush roller down. Start the frame slowly and examine your warp carefully to ascertain whether your size is up to the standard or not, as sometimes water will accumulate in the bottom of the size vat and in the steam pipe, which will enter the vat when the valve is opened to boil size, which will make your size too thin. In this case, draw off old size and replace it with fresh or you might leave the old size in and get some cold water in a bucket and add to it two or three pounds of starch; use your hands to dissolve it thoroughly, then empty it into the size box and boil 10 minutes.

By thus adding to the old weak size, you get good results besides you save so much. Don't forget to watch your size all the time, if it is falling off of the warp in the weave room, it is not cooked enough in the size kettle, or is not boiled into the yarn in the size box or vat. In case you can't stop it from falling off, change your formula and use quantities sufficient to overcome the trouble, keeping in remembrance that you want the size in the yarn and in it to stay.

We are governed in making size by the number of the yarn and kind of looms we are slashing for, and the per cent. of size wanted. Observe all the above rules and you are sure to meet with success. I will give you a sizing formula for print cloth.

Water	120 gallons
Corn starch	60 pounds
Tallow	9 pounds
Beeswax	1½ pounds

Boil 60 minutes or until thoroughly cooked.

GRADING AND MIXING.

(ONE OF THE PRIZE WINNERS.)

BY W. P. HURT, TRENTON, TENN.

Grading and mixing cotton is of more importance to the manufacturer than any other special line of work connected with the process. Long and short fiber will not spin well together, while coarse and fine silky fibers give a yarn full of weak and heavy thick places that does not run well in spinning. This is one of the reasons why we have bad running work one day and good the next.

In all localities bales of cotton come into the market with more or less different lengths of staple. Say we have a local cotton of seven-eights or one-inch staple, while low damp fertile land will produce one and one-eight to one and one-quarter-inch staple. This is averaged at one or one and one-eight staple, generally called local cotton. In

such localities as Memphis, Dyersburg, Vicksburg and other cotton districts the graders do a good business. Quite often the cotton merchant knows nothing about grading, but employs an expert and his season's purchase is gone through in a careful way; every bale of certain length and cleanliness is tagged and numbered. The tag usually contains two numbers, one of them being afterwards torn off and carefully wrapped in the sample with the length of staple marked on the tag.

All of this cotton is generally bought from the farmer at market prices. When graded the cotton measuring one and one-eighth or more brings a premium, or in other words the longer the staple the better the price it brings to the merchant. The longer the staple the more the manufacturer of the various lengths will pay for it.

How do we determine the length of staple? By taking a lump of cotton from the bale and grasping it with both hands, gently twisting and pulling the lump in two parts. Throw the part down from the right hand and with the forefinger and thumb pull the fibers from the left hand and back again until the fibers are thoroughly cleansed from all foreign matter and lie parallel. The length can then be measured with an ordinary rule, and the exact length of staple determined. Here is what we save by pulling and measuring cotton before it enters the mixing; we save for our employer thousands of pounds of yarn and cloth every year that would otherwise go as seconds or be made into waste.

Many of the mills using local cotton depend entirely upon the local cotton merchant and one-half of those will tell they can tell the length by pulling or picking a tuft to pieces between their fingers. This is absurd. Quite often have I had cotton merchants tell me they could determine the exact length without pulling or measuring. I simply looked wise, went into the mills using their cotton and found plenty of cockled yarn and the foreman moving rolls trying to prevent it. It pays the carder or superintendent to pull and measure the staple of every bale before allowing it to enter a mixing.

Many young men are anxious to learn the theory of manufacturing, and copy every little short note from newspapers, textile books and other sources. Those are good in their places, but I would advise every young man who aspires to important positions in textile manufacturing to take the short road through a reputable textile school, and afterwards keep the mind brightened by reading and learning every advanced idea whether practical or theoretical. In all textile schools as much or more stress is laid on the importance of grading and mixing than any other part of the textile course.

I mention this because so many are prejudiced against the young man with a textile school education. The best and most competent managers as well as the most successful, are proud of their textile school education. And such coupled with a practical knowledge of the business means success to the aspiring young man.

Let every mill carefully grade and mix its cotton. Get each mixing blended and note the results in spinning and the quality of yarn. I am aware that mills in the South are giving this more attention than in past years. And many are the mills that would rather have an overseer leave them, than have him put in a mixing of cotton without carefully pulling and measuring the staple on both sides of each bale. When you point out a man who practices grading and mixing, I will point to that man as one who makes money for his company. I may say here, that yarn that sold ten to twenty years ago for a good price and was considered fairly good would not go on the market as seconds or low grades now. Why? Because men have learned to do things better, to get better results from every source, and things that seemed almost too small to care for twenty years ago look like giants to-day, and now we call them big things.

Opening and mixing should be done with greatest care. Open as much as space will permit, but do not open and mix any bale that will vary 1-16 of an inch either way from your standard. Regarding the variation in numbers, the shorter staple cotton loses more and weighs less when spun, while the longer staple loses less and weighs more when spun into yarn. Thus a lap, weighing forty pounds made of one-inch cotton and spun into 40s yarn should then weigh about 36 pounds. If made of 1¼-inch staple and run with the same draft, the production could be increased at every machine from slubbers to spinning, and each machine would use a twist gear from four to eight teeth larger.

If the reader will watch this point, and mix only cotton of the length your goods require and reject all other, your goods will never vary more than five points from standard and your yarn will not vary more than twenty-five points either way from the standard number. Any one can depend on such mixing, and with such as mote knives, screens, and breast-plates on cards, all having the same setting, a regular running yarn and cloth can be obtained.

THE MANAGEMENT OF HELP.

(ONE OF THE PRIZE WINNERS.)

BY C. L. HARRIS, NEWBERRY, S. C.

This is a subject that has, I think, grown to colossal proportions owing to the rapid multiplication of cotton mills, which offer additional employment to so many people, thus making it so easy to obtain work. It is one of the gravest propositions that confronts the mill manager to-day. It is a self-evident fact to every wide-awake manufacturer that the man who can not successfully manage help is rapidly becoming useless as a superintendent, for it takes good help to run a mill.

In the first place, I consider that a successful manager of help must be a man, and when I say a man, I mean it in every sense that the word implies. And further, he should be a man all the time; he should also strive to be at his best morally and socially. He should always be found on the sound and safe side of every moral and social issue that is brought before the community in which he lives. Now, I am well aware of the fact that many men, at least until recent years, have attached very little importance to the moral and social qualifications of a manager of help. But let us pause right here and think for a moment of the effect of the morality and sociability of our superiors upon us, and to what extent these qualities have contributed to their success in controlling us.

Let us not try to deceive ourselves into believing that our community and our help are indifferent to these things, though they may sometimes seem to be. Many a time you will, if you are a manager of help, be the subject of discussion around the tables and the firesides of your opera-

tives, and if they are able to link your name at all times with that which is clean, pure, and manly, whether they be children or adults, and especially if they be children, it will stimulate them to imitate you, and will give tone to their conduct, which will make a tremendous contribution to your efficiency and influence when they come under your control. So much for the moral and social qualifications of an overseer.

Now I think the next most valuable asset that an overseer can have to successfully manage help is a competent second hand, and a set of section men who are interested, careful, friendly, tactful, and impartially courteous to the operatives. This need not, when intelligently practiced, eliminate any of the rigidity of system, for I heartily endorse a reasonably rigid system. Since it is very seldom that an overseer finds, on going to a new position, a set of men possessing the above mentioned qualifications, and since he often can not hire them, it is his duty to train them, and instill these qualifications into them. An overseer must have, for the sake of example, if for nothing else, a second hand and set of section men who are interested in their work. For their examples are contagious and spread rapidly.

There are several things by which an overseer may awaken the interest of his men, but I shall just mention one which I consider productive of the best and most permament results, and that is, to stay in close, friendly but not familiar, touch with them and encourage them to diligently apply themselves to the mastering of the details of the machinery in their charge. They should also try to discover any defects that may exist and discuss the remedy for it.

There are many overseers in the country who seem to think, or who want to create the impression, that they know it all and are not willing for any one, especially their own section men to teach them anything new. The fact of the business is that every practical man knows that there are small peculiarities about every job, and oftentimes about several machines on the same job, that no man knows or ever will know, except the man who puts on the overalls and works around the machine for hours at a time watching and studying for those peculiarities.

There are not one-third of the men on sections to-day who are going to do this when they feel that when they make the discovery, they are not going to receive any encouragement or credit for it from the overseer. I know an overseer now who is losing immeasurably in the quality of his production just on account of the above-named trouble. He has a man in his room who practically holds the key to his trouble, but this man's ideas have been snubbed and discouraged by his overseer until now he has no idea of trying to put them into execution. Thus it is greatly to the advantage of the overseer to furnish the incentive, and inspire and spur his men on to closer application and greater development in usefulness for his employer.

Now, in regard to the treatment of help in general, each overseer should in his daily duties so impress his help that each one in his room, from second hand down to sweeper, would feel sure that when he comes to him with a reasonable request or grievance he will at least receive careful consideration and an impartial hearing.

An overseer can by his careful example and precept train all those in authority under him to accord those under them the same kind of treatment. An overseer should train his second hand and section men up to the highest point of efficiency, and then stand behind them and support them to the limit of consistency, and make every hand in the room feel that he or she will be promptly punished for any violation of any set rule and punished, too, without fear or favor. I have no sympathy with the idea that is abroad in the land that you have to be lax and loose with help in order to hold them. I believe that if the ideas as set forth were put into effect in the mills of this country to-day, they would add greatly to the effectiveness of the management.

SETTING THE HARNESS.

(ONE OF THE PRIZE WINNERS.)
BY JAMES GARVIN, LOWELL, MASS.

In discussing weave room problems, there is one that is very little mentioned, but is one of great importance in connection with the production of a fabric, I refer to the setting of the harness. A loom may be in perfect order in every other respects and yet the harness may not be set properly to obtain the best results on the class of goods that are being woven. If we are weaving light picked lawns, we must set our harness even, with the crank on or near the front center, otherwise we will have "cracks" in the cloth almost every time we stop and start the loom.

If, three, four or five-harness goods or fancies are being woven, we should set the harnesses even, with the crank a little forward from the bottom center. If we have heavy sheetings or duck we should set the harness even, with the crank at bottom center and raise the whip roll higher than the center of the shed; this will spread the warp threads evenly in the fabric and hide all reed marks. For every heavy duck or other heavy fabrics such as denims, etc., we may set the harness even, with the crank earlier than bottom center. Experience teaches us that the heavier the fabric is, the earlier should the harness be set, as in doing so we can put in more picks per inch without the cloth beating back and feeling loose on the loom. Of course, there is a limit to this rule, for if we set the harness too soon, it will be closing the shed before the shuttle has time to get through, and we will have skips at the selvage, or the shuttle will be trapped before reaching the box, and the loom will bang, and perhaps cause damage to warp yarn.

In weaving corduroy we must set the harness even, with the reed up to the cloth, just the same as for light lawn. The reason for this is that corduroy warp yarn is usually two or three-ply twisted yarn and the filling is usually soft twisted single yarn, so we can easily see that if the harnesses pass the center in changing before the pick is beaten up, the pick is sought between the two shades of warp crossing each other, and as the reed pushed the pick into place in the cloth, the soft filling yarn is sawed between the twisted warp yarn, and is cut, which is a serious defect to corduroy.

In weaving a fabric with tape selvages such as sateens, etc., the selvage motion should be set to change slightly later than the body harness, as this will cause the selvage yarn to weave tighter than it would otherwise do, and we will thus avoid selvage skips. Sometimes, however, we depart from the foregoing rule for some special reason that

may apply to some particular case, as for example, if we have a soft warp that is weaving badly, we can reduce the strain by setting our harness a little later, or if we have a loom that is weaving kinky filling, we can sometimes remedy the trouble after all other efforts have failed, by simply setting the harness a little earlier, as this causes the shed to close on the pick and takes up the slack all the way across before it has time to kink in one place.

Another thing that is worthy of mention is the fact that many a bad warp that ordinarily would not weave had been made to weave well by simply setting the harness on the opposite pick. This may seem ridiculous to some readers, but those who have had practical experience know it to be a fact. The foregoing refers to looms whose crank is on the top center when the loom picks the shuttle, but some looms run the opposite way, and the shuttle is picked with the crank at bottom center, and on such looms we would have to set our harness differently, and reckon from top center instead of bottom center. A slight difference would be experienced here, as the bottom center of the former would be slightly earlier than the top center of the latter, caused by the pitman pin being higher than the center of revolution of the crank. This pitman pin is put higher purposely to cause an eccentric motion of the lay, that is, the lay pauses longer at the back of the throw than at the front. This accomplishes two purposes, first, the shuttle has more time to pass through the shed owing to the pause of the lay at back center, and secondly, the lay comes forward quickly and strikes a quick sharp blow to drive home the pock at front of the center.

One more point to consider in setting the harness is the shape of the cams we are using, for if we are using a round cam the shed will not open so quickly as it will with cams that are more or less elliptical in shape. If we should happen to be weaving a fabric that would occupy the full width of the reed space, and had round cams on the loom, we should have to set our harness to suit the shuttle entering and leaving the shed. With such a fabric I would suggest using a different shaped cam.

A good section hand will always see that in setting his harness, the straps will pull evenly, and will roll evenly on the top rollers. The writer has seen many a loom where the straps would overlap on one pick, and on the opposite pick the other strap would be pulling away from the top roll. Harnesses that are set in such a manner can not produce good work. This fault is more in evidence on a five-harness sateen.

A CARDER'S TROUBLES AND HOW TO OVERCOME THEM.

(ONE OF THE PRIZE WINNERS.)

BY R. L. STEVENS, COLUMBUS, GA.

The picker room and its management have a great deal to do with bad work. Aprons slipping and lap splitting give rise to a great deal of trouble. The waste fed in with good cotton should be mixed as nearly uniform as possible. Keep a good set of evener belts on your eveners and keep your beater blades sharp, as a round edged beater gives trouble after the laps leave picker room. Keep good belting on the eveners and make your evener traverse easy. Have your laps condensed the same and see that they weigh just right and most of your trouble in the picker room will be avoided.

With cards we find various troubles. Many carders do not notice about the draft that get under the cards, from openings around the bottom. The bottom of the sampsons should be blocked up air tight so as not to allow any air or draft to get under the cylinder, because the more draft that gets under the cylinders, the more dirt and fly go out into the sliver from suction of the lickerin and cylinder. This fact alone will prevent you from getting the same results from card with the same settings all through. The entire bottom of the sampsons should be air tight, so as to allow the cards to be set to the same gauge. This alone will help in the evening of the sliver, and give an equal amount of fly and motes from each card.

The back draft preventer that shields the cylinder between the lickerin and flats is the most important part about a card setting, and is a point that has evidently not been studied thoroughly, as this draft preventer plate has given more trouble to a card and spinning room than any other point about the card. There are more cloudy and neppy slivers caused by this preventer plate being set wrong than any other two setting points about a card. This plate is adjustable, and if properly set will lay the fibers smooth and straight on the cylinder, after the lickerin has delivered same to the cylinder, thus giving the flats an opportunity to card and clean the fibers and take off such as motes and neps from the straight fibers that have been properly prepared for the flats to act upon.

If this plate is set too far off from the cylinder, it will cause cloudy and lumpy work, because the draft will be too great between the plate and cylinder, and the fibers will catch to the edge of the plate and roll under, thus forming lumps. Furthermore the flats will take out such fibers as should go into cloth. To set this plate as close as 7 or 10 gauge will break the draft between the plate and cylinder, and cause the fibers to lie straight on the cylinder and they are then prepared for the action of the flats. The flats will then take nothing out in stripping except the card slubs and such other impurities as ought to come out of the cotton that the mote knives failed to reach at the back of the cards. With this setting, the sliver will be smooth and even.

Another point that requires consideration about a card is that of flat stripping in front of each card. The variations in the weight of slivers are partly caused from that fact. Some strippings are much heavier than others. The heavier the strippings are, the lighter the sliver, and conversely, the lighter the strippings, the heavier the sliver.

The strippings are governed altogether by the draft between the stripping plate and flats, and it is very necessary to have the strippings all to weigh equally from a certain number of flats. They should be weighed about an hour after the strippers have stripped the cylinders clean.

We now come to a consideration of the drawing frames, the carder's greatest trouble. This is considered the simplest machine in the card room, at the same time drawing is one of the most important, and should always have the best help to operate these machines that can be found. They should know the nature of cotton, and should correct the slightest defect that occurs on a frame, as bad work on the drawing is really worse than bad work on any machine in the mill. One great trouble of some carding is that the calender roll of the drawing sometimes

draws just a fraction too tight, but not enough to pull the ends down, and not enough to see plainly. It is not enough to change the gauge for, as it will run too loose. Changing gears continually will give trouble throughout the entire mill. However, the only remedy for this trouble is to change the gear on the front roll that drives the calender rolls, as the change then will not be so great as a change of the calender gear.

Another important point about a drawing frame is that of the preventer roll gear at the back of the frame. The roll behind the frame that pulls the card slivers from the cans sometimes gives a great deal of trouble. This roll should be geared up so as to run just as fast as the back steel roll, but no faster. If it runs faster, the slivers will pile up behind the rolls, and if it runs slower than the steel roll, the slivers will be badly stretched between the steel roll and the preventer roll, thus causing a lighter sliver and producing more or less uneven work.

In regard to oiling the drawing frame, some carders give orders for the drawing rolls to be oiled about three times a week, whereas they should be oiled about twice every day.

We will now take under consideration some of the troubles on the slubber. If the draft of the slubber is kept within the proper limits and the tension and lay are right, there can not be any mistake or fault found on this machine. If the slubber rolls are cleaned and oiled properly, it is practically impossible for this machine to make bad, uneven work. This assertion will apply also to the intermediates and flyer frames.

To sum up: If the cards are properly set, they will take care of a great many of the defects that may come from the picker room, and if the drawing frames are in perfect condition there will be good, even work. On the other hand, if the cards are in first-class condition and the drawing frames are in bad condition, the work will be bad throughout the mill.

FINISHING PLAIN GOODS.

(ONE OF THE PRIZE WINNERS.)

BY H. G. SMITH, CONVERSE, S. C.

It is indeed strange that in a great number of mills on plain work, so little attention should be paid to the cloth room. There seems to be a predominating idea that after leaving the loom the cloth can be treated in almost any fashion, provided it is measured, weighed, baled and shipped. Yet the reasons for just as much care with the cloth are quite as obvious as those for each process through which the cotton goes in the manufacture of the fabric. In fact, there should be a stricter and more continual vigilance exacted when in the finishing process than in any other, for having already devoted so much time and expense to the manufacturing of the goods it naturally follows that every effort should be made to save not only the work of this department itself, but the work of those which preceded it.

Stitchers for sewing the ends together are generally run by boys, and are very often the cause of more or less trouble. If the last stitch is not made to loop and catch properly the whole seam is very apt to ravel, and more especially by the next process of the calenders. When this does occur form one to four yards of cloth are torn off and wound up, necessitating the re-threading of the machine and costing the waste of that cloth and the lost time of the machine and its tender. Should the ends of the cuts be allowed to go on the shells in a wrinkled state they will become very badly creased and as these creases and wrinkles are seldom wholly removed in any of the succeeding processes, the cloth will have the appearance of an uneven state which shows up very badly at the ends of the folded cloth. A little care and attention spent on the stitchers will be found to save itself many times in the latter processes.

The calenders should be kept absolutely clean at all times. Just after each roll of cloth is run off, all threads should be pulled from the brushes, blades, and fan. The machines should be thoroughly cleaned inside, for if the dust is not removed from the inside it will be found impossible to keep them clean on the outside, no matter how often fanned off or cleaned. There should be no waiting until Saturday for a thorough cleaning of these machines, for since they are designed to brush, clean, and finish the cloth, they should always be kept in a state ready to do their work. The tension on the back roll of cloth should be carefully watched as there is a tendency to stretch the cloth too much, which pulls the filling threads so that they do not lie straight across the cloth and thus ruin its appearance. If steam is used in connection with calendering, there is sometimes an excessive amount turned on the cloth, and the rolls are frequently heated too hot; this will give the cloth a hard, rough feel in the former case and a puckered appearance in the latter. Turned up selvages or as they are sometimes called "double edges" should never be tolerated. A determined effort should be made to have all cloth rolls made even and as large as convenient. The one assists in obtaining an even fold and the other in the dispatch of the work.

The inspection and grading naturally depend on the class of goods being made and the kind of standard desired. In any case a note should be made of all defects in the cloth, specifying the nature of the defect and the number of the loom on which it was made. Very bad defects should be sent back to the weave room and shown up to the weavers responsible for them. A list of the minor defects should be sent back once or twice a day to the weaver room, so that the trouble can be located and corrected. It is a good plan not to let the inspectors (if the inspecting is done by hand) do their own grading and cutting, but have them turn over everything of a doubtful nature to one grader who should be a more competent person, for then a better judgment can be exercised by one who knows exactly what is being thrown out or accepted than could possibly be done by several who only know of what they are doing individually.

All loose threads should be pulled off of the selvages and not brushed in, as nothing looks worse upon opening a bale of goods than to have a mass of tangled threads greet the eye. In baling the cloth, each cut should be placed accurately on top of the other, making the bale as even as possible. The side burlap should be well pulled up before sewing in the head which should always be as tight as can be pulled. Too much emphasis can not be laid upon this, for we too often see the heads pulled away or nearly off after they have had considerable handling.

Finally one can not urge too strongly the necessity for cleanliness and neatness in every detail of the cloth room work.

Practical Problems Discussed by Cotton's Readers.

Discussions of Mill Problems are Solicited for this Department.

ANSWER TO G. C. B.

EDITOR COTTON: In answer to the statements by G. C. B. regarding spinning yarns, in the September issue, beg to submit the following views: The statements were:

(1) A spindle spinning coarse yarns produces a greater length of yarn than one spinning finer counts.

(2) Fine spinning requires more labor for each spindle than coarse spinning.

The first statement is correct and the second is wrong. To illustrate my position I call your attention to the fact that the production of a spinning frame is not limited by the spindle, that is, the spindle can go faster if other things permit. The traveler can also go faster; but, if the front roll on fine work should run as fast as the front roll on coarse work, the ends would come down.

On 65s warp the front roll (1 inch) runs 84 revolutions per minute, while on 14s warp the one inch front roll runs 140 revolutions.

	65s warp.	14s warp.
The speed of the spindle is.....	9,600	8,200
Spinners are paid per 100 spindles	$0.80	$1.08
Spinners run	1,200	684
Spinners earn per week	$9.60	$7.37

Of course some spinners can attend to more spindles than others on any kind of work and the weekly earnings would fluctuate accordingly. In general a spinner on fine work, where neatness and skill are required, will command a higher weekly wage than coarse work. *J. A. N.*

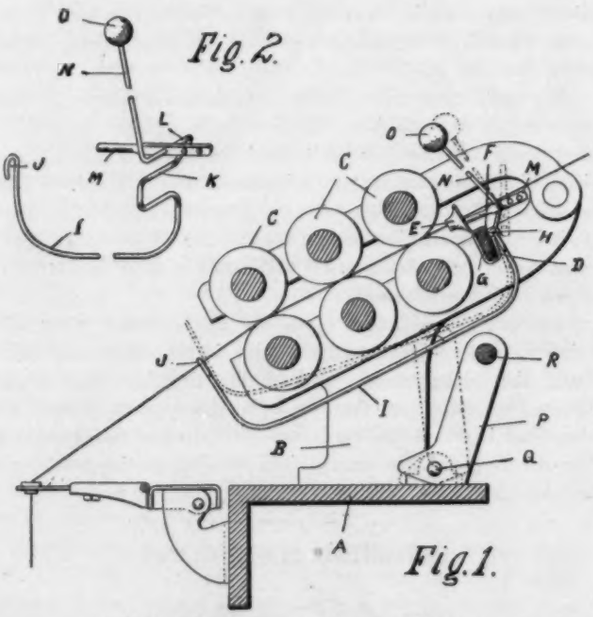
PLAIN QUESTIONS FOR CARDERS.

EDITOR COTTON: Practically every carder has his own individual way of running his room. One carder has his machines set according to certain rules, and he has special methods for handling the cotton while under his care. Another carder may set his machines differently in some instances, and yet obtain satisfactory results. Again, one carder might be getting satisfactory results, but could get better results if certain details were changed. I am, therefore, submitting a few questions for both carders and superintendents, so that different ideas of the different carders may be exchanged through the discussion department of your paper. Suppose we are using middling cotton and want to make 20s warp yarn:

1. What is the proper way to mix the cotton?
2. Should the feeder hopper be kept full, three quarters, or one-half, and why?
3. How do you set beaters on breaker, intermediate and finisher lappers?
4. How do you set your grids on each machine?
5. What weight per yard lap do you have on each machine?
6. Where should the evener belt work on the cone pulley, when the laps are the right weight?
7. What difference does the draft make on a lapper?
8. Which is the better card to use, a 40-inch or 45-inch card, taking everything pertaining to 20s warp yarn into consideration?
9. Which is the best draft to have on a card, and what difference does the draft make?
10. Which makes the cleanest carding, quick or slow speed?
11. Which makes the strongest yarn, quick or slow carding? Yours truly, *The Old Swede.*

ROVING STOP MOTION FOR SPINNING FRAMES.

EDITOR COTTON: As a subscriber to your paper, I have the following comment to make: On page 404 of the August issue you give an article on "Roving Stop Motion for Spinning Frames."



STOP MOTION FOR SPINNING FRAMES.

In the first place your sketch leaves out the under clearers. Of course if your device is absolutely perfect, there would be no ring-lap waste, but in my opinion the under clearers do more than simply take care of the lap waste, in that they clean the rolls of all lint and fly. Your sketch would not seem to allow for room for your device with under clearers.

Second, from the thread guide to where the stop-motion rested on the yarn the distance would be as far as the twist would go, and it seems to me that from the stop-motion to the rolls being without twist the yarn would be very liable to break. It has been shown on several different occasions that two bearing points on yarn kill the twist and consequently prove the failure of the device. If I am in error, should be glad to see further discussion in an early number. *C. M. Bates.*

SPINNING YARNS.

EDITOR COTTON: In answer to G. C. B. statements with reference to spinning yarns, which appeared in the

September issue, would say the first statement is correct. It is true that the speed of the spindles is increased for finer work, but production of length is based on the speed of the front roll. The speed of the front roll is not increased in proportion to the speed of the spindle for fine work, in fact it is decreased, as will be shown by the following example:

For fine warp yarn we will take 36s; the speed of the spindle is 9,000 turns per minute, and the speed of front roll is 117 turns per minute. This would produce about 350 inches of yarn per minute. Now if we change on to 9s without reducing the spindle speed, we would have 233 turns of the front roll, with a delivery of 700 inches of yarn per minute. This is about 25 to 28 per cent. too much for the well running of the work, so we reduce the speed of the spindle 27 per cent. which leaves it 7,300.

This would give a speed on the front roll of about 171 turns per minute, and 513 inches of yarn. Thus, we have a fine spinner producing 350 inches of yarn per spindle, while the coarse spinner is producing 513 inches, per spindle per minute. You will thus see that the coarse spinner has to handle much more roving than the one on fine. To offset this, we give the fine spinner about one-third more spindles to tend. *W. A. M.*

WINDING INQUIRY.

EDITOR COTTON: Will you kindly give me information regarding the following order:

A mill has accepted an order for 200,000 pounds of No. 8s yarn, to be wound on 6-inch parallel tubes, and I want to know (1) what quantity of yarn is generally put up on each tube, and (2) how many tubes would be needed for this size order, also (3) if there is any tare deducted, and if so, how much?

I should also like to know what is the standard weight paper cone; how much yarn is placed on a standard cone, and what is the deduction for the weight of the cone by purchasers, that is, what tare is deducted from the package. *Hart.*

DRAPER LOOM'S TROUBLE.

EDITOR COTTON: In regard to "Draper Loom's" questions in August issue, I would say, the right hand fork of a Draper loom is not intended to call for a fresh bobbin from the battery. It merely stops the take-up mechanism by lifting the take-up pawl off the ratchet wheel, when the filling is absent. The shuttle is of necessity in the opposite box from the battery at the time when the right hand fork is drawn back to its fullest extent.

The loom he mentions was out of order and was making "thick places." Probably the filling fork hook was set too "early," allowing the hook to catch before the thread lifted the fork. It was certainly lifting the take-up pawl every time it caught, and was thickening the cloth by addition of an extra pick every time it caught. *Whitehead.*

YARN CONDITIONING.

EDITOR COTTON: Please advise me as to the best way to make a good conditioning room in which to condition 24/1 hosiery yarn for knitting purposes. Kindly state best shape for room or box and the manner in which steam or hot water, or whatever is necessary, should be run into the same. *Alex.*

MARKET REVIEWS.

THE COTTON MARKET.

BY H. & B. BEER.

Small as previous crop estimates were, 11,000,000 to 12,000,000 bales, and the consensus of opinion placing the crop at about 11,500,000 bales, to-day's ideas of the probable size of this year's production are lower than they were one month ago by about 500,000 bales. Estimates now range from 10,500,000 to 11,500,000 with the consensus of opinion leaning to a probable yield of about 11,000,000 bales, against 13,826,000 bales last season, or nearly 3,000,000 bales less. It is for this reason that prices have continued to advance notwithstanding the present level of values to be the highest for this time of the season for the past 35 years, no such prices having been paid during October since 1874.

During the past month, Mr. Ellison, the English authority on cotton consumption, estimated this year's consumption of American cotton at 12,625,000 bales against 12,860,000 bales last season, only 235,000 less, and of foreign growth 2,650,000 compared with 2,109,000 bales one year ago, or 541,000 bales more; the total consumption of the world of all kinds of cotton being placed at 15,275,000 bales against 14,969,000 last season, or 306,000 larger. When it is considered that this year's crop of American cotton promises to be nearly 3,000,000 bales smaller than last year's production, and that the requirements of the world will be only 235,000 less than last season's consumption, the strength of the position of cotton can be fully appreciated.

According to the report of the National Ginners' Association, issued near the latter part of October, only 5,320,000 bales were ginned to October 18th against 6,296,166 bales to the corresponding date of last year. It is said that 79.7 per cent of the crop has already been picked compared with only 54.5 per cent. one year ago. Therefore, it is to be presumted that as 48.1 per cent. of the crop of last year had been ginned to October 18th, that about 55 per cent. of the crop has been ginned to the 18 inst., the incentive to harvest, gin, and market quickly being the unusually good prices paid this year—about $25 per bale more than at this time in 1908. We are of the opinion, however, that the Census report on quantity of cotton ginned to October 18th will show more cotton ginned than reported by the National Ginners' Association, probably by about 400,000 bales, which, on the basis of 55 per cent. of the crop ginned to 18th inst., plus linters, would point to a total yield of about 11,000,000 bales. Nevertheless, there are any number of well-informed people—men who are experts and who have been over every acre in the belt—of the opinion that the year's produc-

tion will not exceed 10,500,000 bales, and claim that Texas will do well to make 2,250,000 bales compared with about 3,819,000 bales last year.

In its report the National Ginners' Association says in part as follows: "The yield is reported disappointing in all sections of the belt, probably due to smallness of the bolls. Mississippi, Louisiana, and Arkansas have the shortest crop ever grown, and will total only a little over half of last year's crop, while Texas is not much better." We have kept in close touch with developments of the crop and gathering of same in the whole belt, and while we have always admitted the South Atlantic States to have good prospects, we have constantly tried to impress upon our

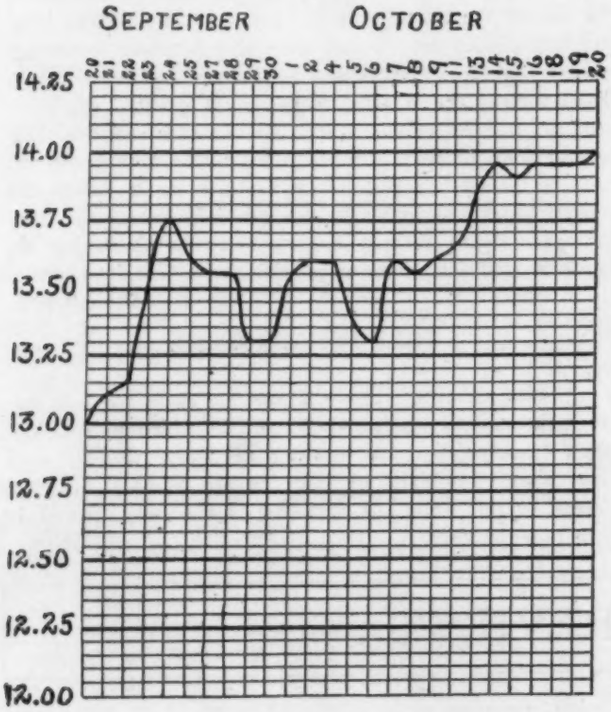


DIAGRAM NEW YORK SPOT COTTON SEPT. 20-OCT. 20, 1909.

readers the very unfavorable outlook in the Mississippi Valley and the Southwest. Notwithstanding the gradual rise in values from 8⅜ cents last winter, we have never lost confidence in the probability of the market reaching unusual high levels this season, and although middling cotton in the South is now quoted at about 14 cents, we are of the opinion that prices are due to go higher eventually. The falling off in receipts that is sure to come, the amount marketed already being 250,000 larger than to even date of one year ago in face of the indicted yield being nearly 3,000,000 bales smaller than last year, assures an early falling off in arrivals that will probably be termed a perpendicular drop in the not far distant future.

We do not think that the curtailment entered into by spinners will be extensive enough to prevent a scarcity of supplies next spring and summer. Cotton goods have experienced a big advance in prices and will probably be put higher in order to permit a profitable margin for spinners to work on. This is the only solution of the matter, and the sooner the American mills lay in supplies, just as Europe is doing, paying the price but getting the stuff, the better it will be for our home industries. The accompanying diagram shows the fluctuation in price, from day to day, of spot middling upland cotton in the New York cotton market from September 20th to October 20, 1909. Starting at 13 cents on September 20th, the price rose irregularly 100 points when 14 cents was reached on October 20th. Just four months previously the quotation was 11½ cents.

THE YARN MARKET.

The state of the market during the past month differed very little from that of the preceding month, and exhibited a very unsatisfactory and more or less puzzling condition.

The continued advance in the price of cotton and the concerted movements to further curtail production in the yarn mills, have had the effect of bringing out more inquiries for yarns, but as a rule business has not eventuated to any extent, so that it could be said to have effected conditions, because spinners still maintained their demands for higher quotations.

The situation developed into what might be termed a detailed market, as the price at which a deal was made was governed more by the individual case, rather than the nominal quotations. For instance, where a buyer wanted a special specification, he had to meet the spinners' figure, whereas, if some stock yarn was to be disposed of by a dealer who probably procured the same at a lower figure, he was willing in most instances to dispose of it below the ruling prices. This kind of business materially produced an irregular market.

Very little future business was done during the month, because of the indisposition of the buyers to meet the prices asked, and the reluctance of the sellers to make quotations that would appeal to prospective buyers who showed a desire to do business.

It seems rather improbable that such a complete deadlock can continue very much longer, because the supply of stock yarns is gradually diminishing. This one factor has worked greatly to the disadvantage of the mills, and has in a large measure acted as a check to further advances in prices. Whether the proposed curtailment will have the effect of raising the prices of yarns or cause a decline in the price of cotton is a matter that time alone will settle, but in either or both cases, it will tend to clarify the atmosphere in the yarn market.

Near the later part of the month the market showed a bette rtendency to advance than for a long time, and the opinion is held by some that prices have reached about the top figure. For this reason, dealers are not buying yarns in any quantities for their own account, and as buyers have not accepted the present level of prices, the result has been stagnation in trading. There has been a very small demand for knitters' yarns during the month, in fact the knitters appear to be taking only a sufficient amount to cover present requirements.

THE KNIT GOODS MARKET.

Although last month in the knit goods trade was between seasons and the market very well for the first week, the succeeding three weeks found a great deal of activity among the buyers. A large quantity of contracts had been made for the 1910 spring season at advancing prices, and those prices have not only been maintained, but have had the effect of bringing out inquiries regarding duplicate orders and quotations for the winter season goods for 1910.

The duplicate business for winter goods has been very satisfactory and especially in the fleece lined hosiery trade, which has enjoyed remarkable activity for some time. In fact spot goods in this line are practically an unknown quantity, and some mills are turning down orders. Contracts are made so far ahead that it seems certain that some deliveries will be so late as to compel the merchants to carry the line over until next winter.

Buyers have come to a realization of the fact that current quotations are very satisfactory to them, especially in view of the advances going on in the cotton and yarn markets, and they are not only paying the prices asked on duplicate orders without question, but are looking ahead for the fall season of 1910.

It is a little early for the opening of the fall season, but some small amount of advance business in this line was put through towards the latter part of the month.

The interest shown in the full fashioned goods during the past month has exceeded that exhibited at any time during the season. This was brought about by the fact that sellers have maintained prices at the old figures, and the buyers are eager to take advantage of that condition. As a consequence business has come to the dealers without any effort on their part, and the mills have about as many orders as they can comfortably take care of. It is probable these low range of prices for full fashioned goods will not continue long because based on current prices of raw materials, they are selling at a loss.

The Textile Mill Situation in the South and New England.

SOUTHERN MILL SITUATION.

(Special Correspondence)

Interest of Southern mill men for the month past has been centered in the actions taken by various textile associations looking to heavy curtailment of production. Numerous important meetings have been held and all were largely attended. Perhaps the most notable meeting of the month, and the one which set the pace to be followed by the other associations was that of the Board of Governors of the American Cotton Manufacturers' Association, at Charlotte, N. C. At this meeting there were two questions to be decided; the place of meeting for the next annual convention of the association; and means of bringing about an improvement in market prices on yarns and cloths. Charlotte was selected as the next meeting place, and the second Tuesday in next May is the date.

In regard to the second proposition, the action taken was, in effect, a recommendation to all mills in positions to do so, to close down one or more days each week, and keep this up until prices of cotton goods are on a parity with prices of raw material.

C. B. Bryant, of Charlotte, secretary of the Association, when asked how the mills were responding to the proposition, stated that already he had received many replies, and that in the majority of cases the mills were signing up the agreement. It is not to be doubted that the required 60 per cent., necessary to make the plan operative, will be received.

The Association represents 20,000,000 spindles. That it is impossible to buy cotton at 14 cents per pound and sell manufactured goods at present quotations, at any profit, is admitted by all mill men. The necessity, therefore, for general curtailment is recognized. In fact, unless conditions improve, mills will be forced to close down entirely, in the opinion of many men interviewed. On this point, T. W. Crews, of Charlotte, secretary of the Southern Hard Yarn Spinners' Association, said: "Unless prices improve decidedly at once mills will be forced to close down rather than continue operations at a loss. Many mills are already closed down. More yarn mills are closed down to-day than at any other time in the history of the industry in the South. Most of the yarn mills are curtailing."

Following the Board's recommendations, the executive committee of North Carolina Cotton Manufacturers' Association met in Charlotte and adopted resolutions heartily indorsing the curtailment agreement promulgated by the Board of Governors of the American Cotton Manufacturers' Association; also urging mills to curtail at least one day a week until prices improve. Similar resolutions were unanimously adopted at a meeting of the executive committee of the South Carolina Cotton Manufacturers' Association, and similar recommendations were made to members.

One of the best posted mill men of the South, speaking of curtailment under way, said: "Conditions affecting the mills are bad, and from many points reports come of closing down of large mills which find continued operations, in the face of existing conditions, unprofitable. It is believed that systematic curtailment will effect a betterment of conditions, and every influence looking to this end is being exerted by mill men."

S. B. Tanner, of Henrietta, N. C. mills, and former president of the American Cotton Manufacturers' Association along with other prominent mill men, has been urging farmers to co-operate with the mills in restoring normal prices to manufactured goods. The mill men do not desire to see the price of cotton lowered, but do urge the farmers to aid them in strengthening the cotton goods markets by buying cotton goods freely now. The cotton planter has plenty of money. He can buy his necessities in the cotton goods line now cheaper than he can at any other time for it is improbable that prices will reach any lower figure. And by buying freely at this time, he will lend a hand in removing the accumulation of stocks from the markets, and in pushing up the price of goods to a paying figure. That cotton mill men are not endeavoring to lower the price of cotton, but rather, by aid of the farmers themselves, are simply striving to bring the price of cotton goods up to a parity with the raw staple, is emphasized by D. A. Tompkins, who has just given out a highly interesting interview.

Mr. Tompkins said: "For 15 or 20 years I have been endeavoring to show that the best way for the farmers to increase the price of cotton was by the encouragement of mill building. Something like ten years ago the cotton States were producing an aggregate of ten million bales of cotton which sold at 6 cents per pound. The aggre-

gate sum received was $300,000,000. Now the crop is 12,000,000 bales, the price is 13 cents and the aggregate receipts nearly $800,000,000. We have 20 per cent. more cotton now, and twice the aggregate income with enough left over to pay for all the cotton mills in the South. All this increase is the farmers' but this is not all. Markets made by the factory population for perishable farm products, have given at least $100,000,000 value to chickens, eggs, butter, milk, vegetables, fruit, etc. These little experiments in the diversification in pursuits and crops would seem to show that prosperity on the farm and in the factory are dependent one upon the other. The Southern cotton manufacturers say they don't want cheap cotton. The farmer who gets 13 cents for his cotton can buy more of his cotton goods and pay a better price for them than if cotton were at 10 or 8 cents. It is upon that basis that we have at last come to a little prosperity."

Reports just made public show that for the first nine months of the present year over $21,000,000 were expended in new mills and additions to old ones in the Southern States. This means an addition to the South's textile equipment of 834,000 spindles and 16,400 looms. Evidently capitalists and investors have an abiding faith in the future of the industry, and are not discouraged by temporary derangement of conditions.

That there is a splendid opportunity for improving the cotton goods trade of the United States with Cuba, Mexico and South American countries, is shown in a report just submitted to the Department of Commerce and Labor by Special Agent W. A. Graham Clark, of Raleigh, N. C. Mr. Clark's report is elaborate, and sets forth various plans which he advises American manufacturers of cotton goods to adopt, in order to increase their trade in these countries. A better system of wrapping goods is one of the points he stresses particularly, the extension of credit, and various other methods are set forth.

That Southern mill men are planning to decrease the production of coarse yarns, which have been manufactured in a proportion out of ratio to the amount of fine yarns for years, and that these same mill men are going to undertake the manufacture of fine yarns, which command better prices and a more ready market, is evident from the coming on an inspection tour of a large party of mill men from eastern North Carolina and other sections of the South, to Charlotte, N. C., Lincolnton, N. C., and other points near Lincolnton where numerous mills are running on fine numbers. There were some twenty prominent Southern manufacturers in the party, and their idea was to ascertain the cost and methods necessary to change their mills from coarse to fine yarns.

Great interest has been taken in the visit of these men and their announced plans, and it is said to be the first move of this kind in cotton mill circles. Many mill men believe this move to be the forerunner of a far-reaching economic and business development in the evolution of the Southern cotton mill business. This action is the outcome of long discussions, on the part of numerous prominent mill men, of the relative costs and profits accruing from the manufacture of coarse yarns as compared with fine yarns. After many seasons of fluctuating demand, depression, and having realized that coarse yarns are exceedingly hard to dispose of at times, and that the profit is not so great as from fine yarns, the Southern manufacturer is now turning his attention to the finer numbers. Leading manufacturers interviewed maintain that Southern mills have suffered too long from a lack of balance between the fine and coarse yarns, turning out too much of the coarse product, and they say that the movement now on foot will result in changing enough of the Southern mills from coarse to fine numbers to establish an economic balance. Numerous mills of the South have already changed to fine yarns. The Elizabeth mill, at Charlotte, N. C., has long been pointed out as one of the pioneer mills of the Piedmont in the making of fine yarns, its machinery being capable of turning out a number 80 yarn.

A resolution was unanimously passed by the executive committee of the North Carolina Cotton Manufacturers' Association, at a meeting recently held in Charlotte, "That Mr. A. C. Phelps prepare articles of agreement for establishing a commission selling agency among yarn mills of the South, and report to the next meeting of the Association," and has been an interesting topic of discussion among Southern mill men. Mr. Phelps, whose home is at Spray, N. C., is an experienced mill man, well versed in the cotton goods business in all its phases, is gathering data and information, and will at a later meeting submit a plan for such an agency. It is said it will provide for the formation of a stock company to conduct the business and for the financing of the scheme, in which the banks of the territory covered by the cotton mills in the South will assist greatly. The strong feature of the plan, likely to be adopted, will be the mustering in of banks and bankers, to aid in holding yarns in the South, and in the warehouses of the individual mills so that there will be little occasion for the market to become glutted with unsold yarns.

The quarterly meeting of the Southern Textile Association met in Raleigh, N. C. on the 20th inst., and there were present a large number of delegates. Numerous mill men of note were present, besides overseers, master mechanics and superintendents. The aim of the officials of this new organization is to run the membership up to 5,000. Numerous topics of general interest were discussed and papers read.

NEW ENGLAND MILL SITUATION.

(Special Correspondence)

For many years there has not been so critical a situation in the textile industry as prevails at the moment. A complete analysis of the present situation is only possible when conditions existing in the New England States are compared with those existing in the Southern States, and to accomplish such a comparison, the writer has just returned from an extended trip throughout the Carolinas, Georgia, and Mississippi, studying the conditions both from the standpoint of the manufacturer of textile fabrics and yarns and the standpoint of the planter. The larger selling houses in New York and Boston were also interviewed.

In recent years, extremely high prices for cotton have usually prevailed after the contemporary crop was harvested, but this year the situation has been quite the reverse. New England and Southern mills, as a rule, cover their contracts and anticipate their requirements by purchasing cotton during the last three months of the year, namely, October, November, and December. During the Sully boom a large majority of the mills secured their requirements of the raw material before prices began to soar, but this year the New York speculators accepted

the government reports of a shortage very literally and began to boost prices long before the first bale had been gathered. As a result New England cotton mill corporations will have a prince and pauper financial situation to contend with this year. The mills that covered their cotton requirements last spring and summer and are sold ahead into the spring months, will make large profits, while the mills that are sold ahead but have not covered their requirements, will sustain heavy losses.

The treasurer of four of the largest cotton mills in New England stated to the writer that each one of his mills was sold up to April 1, on grades that require 1⅜-inch staple, either Mississippi Delta or Sea Island and these contracts were covered by the purchase of raw cotton at an average of 8 cents under current prices.

The effort on the part of the Arkwright Club of Boston and other large cotton associations to curtail production is commendable from every viewpoint and undoubtedly will assist in establishing an economic equilibrium of supply and demand. It is impossible for selling houses to get prices for fabrics that will show a profit or even the cost on raw cotton purchased to-day. J. Spencer Turner Co. of New York will not take a contract or accept an order for delivery after January 1, at any price. Their explanation is that if the contract is taken at prices based upon current quotations for raw cotton, that the purchaser will sustain a serious loss or repudiate his contract if raw cotton declines before the date of delivery. A. D. Juilliard & Co. of New York City are unwilling to accept orders for the future delivery of goods or contracts for any grades of coarse fabrics. They state that during the last boom in raw cotton they were obliged to either sue their customers with whom they had contracts or else go into bankruptcy. This time, they don't propose to do either. They consequently are accepting only spot business. William J. Barrell Co. who handle ducks and drills almost exclusively, report a violent demand during the past two months for spot goods, but they are also unwilling to accept contracts except for immediate delivery and at prices materially higher than for spot goods. One of the mills of this concern has closed down and another is getting ready to close down because of the condition of the market. The above facts will give the reader a very fair idea of the fabric end of the market.

Now as to the manufacturing end—conditions are very unfavorable. Selling houses have taken a decided stand as noted above and because of the influence of those who are urging curtailment, there is nothing ahead for the manufacturer except temporary idleness. The Amoskeag Mfg. Co. of Manchester, N. H. curtailed 25 per cent. during the past month and will curtail still further unless there is a radical change in condition. The coarse goods and the medium fine goods mills will undoubtedly have to curtail heavily before there is an adjustment of prices, but the fine goods mills making finer counts will undoubtedly be obliged to operate because of contracts. It is generally accepted that the advance in raw cotton has a very minor influence on the price of such counts.

In the South, conditions are about as unhappy as they possibly could be. The upturn in general prosperity encouraged the Southern industries to go full speed ahead and as satisfactory profits were beginning to accrue, the dynamic force of the short cotton crop has upset all calculations. An illustration of existing conditions was given by a manufacturer in Alabama to the writer as follows: "We do not purchase our raw cotton until the last three months of the year when the numerous grades that are grown in this vicinity are brought into our own city square for sale. It would have been entirely unreasonable if we had entered our contracts during the late summer months for Texas cotton, which was the first to come on the market, to be shipped six or seven hundred miles to our mill when a few weeks later we could purchase our entire requirements of local grown cotton. As it is we have large contracts for cloth on hand and have hardly a pound of raw cotton to make the goods with. Consequently, we have to operate at a loss until we cover our contracts and then we shall close down."

Yarn and cloth mills in North Carolina and South Carolina are all planning curtailment of a radical nature and everywhere one meets pessimistic and discouraged manufacturers. One of the largest manufacturers in Charlotte stated that never in his experience had there been a situation as critical as the present, and he believed that a heavy curtailment would be necessary before fabrics and yarns would advance to a fair market price.

There is no question but that the planter is rushing his cotton to the market as fast as possible. He realizes that with a crop of 1,500,000 bales under normal requirements, there must be higher prices but on the other hand there is an undertone of suspicion that Northern manufacturers are trying to precipitate a decline in cotton by heavy curtailment and for this reason the crop is being harvested and rushed to the market as rapidly as possible. Exports to date are 8 per cent. ahead of last year at the same time and unless American manufacturers make some purchases, there will be none of the more desirable grades left.

It is generally conceded that this year's crop will be close to 12,000,000 bales but against this small production in America there are reports of a much larger production in India, Egypt, and Russia. The Indian crop alone this year will amount to 5,000,000 bales and although this is a lower grade, the continental spinners will undoubtedly supply themselves in place of high-priced American cotton. The Sea Island cotton planter has had a very satisfactory crop, but on the other hand the longer staples of Mississippi Delta cotton are suffering more or less, because of the advice put out last spring by the Federal Agricultural Department that shorter staples be planted this year so that the cotton could be gathered before the boll weevil could get in his work.

After talking with the representative manufacturers, selling houses, and planters, the writer is of the opinion that curtailment is very necessary to overcome the conditions brought about by the short crop, and to raise prices of finished fabrics to a legitimate basis. There will be general curtailment throughout New England amounting to 20 per cent. to 30 per cent. and in the South the curtailment will probably average higher than this. It is impossible to see any relief from the present high prices of raw cotton or higher prices for finished goods unless this curtailment is put into operation.

Probably one of the most serious problems existing to-day is the large number of new mills and additions that have been added during the past year and will be completed and ready to operate at a time when finished goods are selling at a loss from ten to fifteen per cent. based upon current quotations of raw cotton.

NEW MACHINERY AND TRADE NOTES

PETERSON'S CIRCULAR LOOM.

Efforts have been made for the last hundred years to produce a practical loom that carries a shuttle in a circle, weaving cloth in a tubular form. Anker Peterson, of the Peterson Circular Loom Co. has now produced a weaving machine which is shown in Fig. 1.

The Peterson Circular Loom is constructed in a very simple and ingenious manner, using one or more shuttles

FIG. 1. PETERSON CIRCULAR LOOM.

(the usual number being four) following each other around the circle. The heddles are so arranged that they shift the shed between the passings of the shuttles. This shifting is done by a series of short harness sections adapted to the circular form. The loom runs very smoothly, without jar, at the rate of 250 to 300 picks per minute.

The method of beating the filling up, taking place without a reed, is done by rollers attached to the shuttles, which roll the filling in as they pass. As the filling has the same tension around the entire circumference, the woven fabric will have the same elasticity in every part and consequently possess the maximum strength throughout. Warps may be on beams arranged overhead if desired, and beams of any size can be easily adjusted.

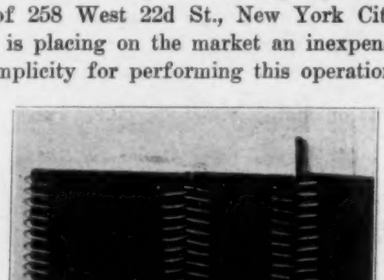
Specially wound filling bobbins are used, which hold as much filling as twelve ordinary bobbins of No. 20 filling. There is no changing of shuttles, and refilling requires less than ten minutes per day. An electric stop motion is provided, which operates with certainty.

Two of these looms are run by the Peterson Circular Loom Co., in Boston, one of which is shown in Fig. 2, having just been completed for making heavy duck, weaving a fabric one hundred inches in circumference at the rate of about a foot per minute. These looms are run by direct-connected electric motors contained within the floor space occupied by the loom. They may be run from any counter shaft by belting.

THE ABERFOYLE MFG. CO., of Manayunk, Pa., has recently installed the Hygrosso Humidifiers in its weaving department, this installation consisting of belt-driven Hygrosso.

MUMFORD'S SQUARE BELT LACER.

Wire lacing for belts has of late years become the standard method of belt fastening in many establishments. The operation consists essentially of threading a coil of wire into the edge of each belt, flattening these coils down, interlocking them on the two edges and inserting a rawhide pivot or pin to complete the hinged joint. Harry T. Mumford of 258 West 22d St., New York City, has invented and is placing on the market an inexpensive device of great simplicity for performing this operation.



SPECIMEN OF MUMFORD BELT LACING.

A nickelplated pattern plate is the essential feature of the invention. Into this the edge of the belt to be laced is placed, being held there by inserting two thumb tacks through holes in the upper lip of the plate. With an awl which is furnished with the outfit, the operator then pierces holes through the belt at the bottom of the slots formed in the turned up lip of the pattern plate. After all the holes have been pierced, a steel wire is threaded through them in helical form, over the wire mandrel which lies inside the lip of the plate. After threading, the belt is removed from the plate and the mandrel removed from the belt. Then the wire lacing is squeezed in a vise flat and even with the belt, or pounded down flat on the bench. The ends of the wire are caught in and clinched to prevent them from loosening. The pattern plate is next reversed, and the other end of the belt is inserted in place. The slots on this other end of the plate lie in a reversed direction from those at the other end, so that the wire coil at one end will be right hand and the other left. This is

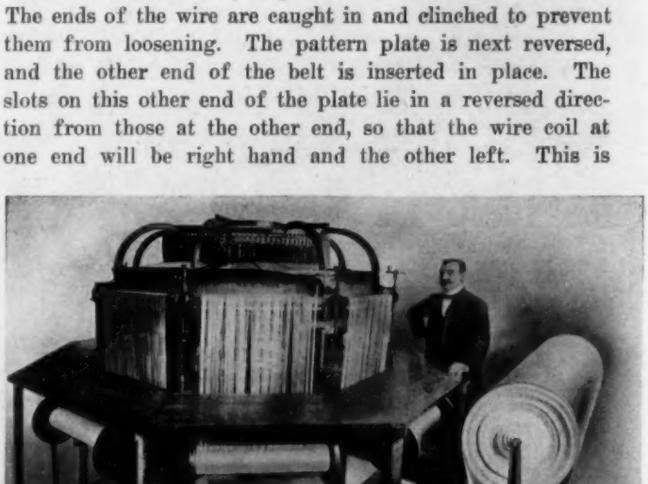


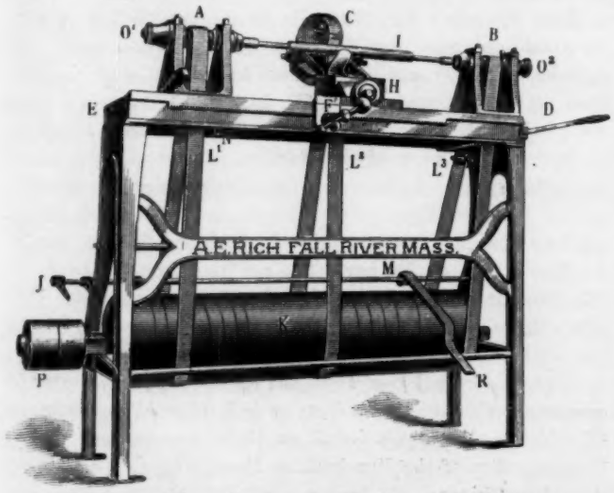
FIG. 2. PETERSON CIRCULAR LOOM FOR DUCK.

necessary to permit them to interlock. The same operation of threading and pounding down is repeated with this end of the belt. The two ends may now be brought together with the coils meshed together when a rawhide pin or pivot is inserted, thus locking the joint, but leaving it hinged and flexible so as to be adapted for use on the smallest pulleys.

The outfit provided includes besides the pattern plate, awl and mandrel just described, a set of rawhide pivots, a supply of wire lacing, extra awl points, thumb tacks, etc. The plate may either be held in a vise, an attachment being provided for that purpose, or it may be held to the bench by means of staples, also furnished with the outfit. It should be noted that by laying the belt crosswise in the lip, the side of the plate may be used as a gauge for squaring up the ends, thus materially assisting in producing a serviceable and efficient joint.

LEATHER ROLL GRINDING AND BUFFING LATHE.

The object of this machine is to lessen the expense incident to rebuffing and leveling leather covered rolls. The machine is free from intricate parts and is easy to operate. The accompanying illustration is given to show the construction and arrangement of parts. In the illustration, A and B on the two heads, each of which holds a center, these latter being used to clamp and hold the leather roll to be buffed. The drum K rotates the two centers through the belts L^1 and L^3. A buffer wheel C is covered with sandpaper, and is constructed so that the sandpaper can be removed very easily. The buffer wheel is partially enclosed in a case which has an outlet through which the dust passes to the rear of the machine.



LEATHER ROLL GRINDING AND BUFFING LATHE.

A handle D is connected to one end of a rod E extending horizontally through the bed of the lathe, said rod being also connected to the head A, so that the latter is made to slide on the bed plate by a movement of the handle D. Thus different lengths of rolls may be placed in the machine for buffing. A spring on the rod E underneath the head forces the latter toward the other, thereby clamping the roll I firmly. A handle F is used to move the carriage carrying the buffer wheel transversely on the bed plate. A screw H is used to adjust the sand wheel to the roll I. T is the shipper for the main belt which drives the drum K. The shipper rod M has connected to it a foot pedal R by which the belt is shifted to start or stop the machine. O^1 and O^2 are adjustable screws to regulate the pulleys in the center of the bearings. The belt L^2 runs the sand wheel. The machine is manufactured by A. E. Rich & Son, 81 Second Street., Fall River, Mass.

AN IMPROVED SHUTTLE.

An improved hand threading shuttle that is attracting very favorable attention at this time is manufactured by the Shambow Shuttle Co., of Woonsocket, R. I. This shuttle has been on the market for three years and the practical tests made during this time have been eminently satisfactory. The shuttle is characterized by its simplicity, there being no more parts to this shuttle than to the ordinary suck shuttle. It is simply a threaded bushing, slotted on one side to allow the thread to enter, a slot cut in the side and top of the shuttle, connecting with the slot in the bushing, and a small shoulder left in the wood that partly covers the hole in the end of the bushing. This arrangement keeps the yarn in the proper place after the shuttle is once threaded. Another feature of the shuttle is that no plate on the top is required as most hand threading shuttles have, and which always proves more or less troublesome, the plate working loose and making bad cloth.

THE SHAMBOW SHUTTLE.

In connection with the Marble shuttle spindle, used on this shuttle, a staple is used at the base of the spindle and thus effectually prevents the shuttle from splitting or wearing at this point. This has been one of the serious defects in securing spindles in shuttles. Another feature of the patented staple is that the prongs are driven into the shuttle just in front of the pin that holds the shuttle spindle, and prevents the spindle pin from breaking out the wood in the shuttle. The application of these patented staples is comparatively recent, having been introduced a year ago.

THE UNIVERSAL WINDING CO., BOSTON, MASS., has issued a handsome catalog giving illustrations of its various machines with explanations for each. By the "Universal" process yarn is wound on a supporting center (cylindrical or conical), in regular helical coils, which reverse with a sharp bend, each coil crossing over the next preceding coil, thus binding it in place at each crossing. The coils being in perfect alignment form a small and compact self-supporting package. By a simple adjustment of the winding machine, the coils can be made to form a "close" wind with adjacent coils in contact, or can be "spaced" as the character of the yarn may require, but with either adjustment maintaining absolute uniformity throughout the package. Among the different machines described may be mentioned the No. 50 for coning and tubing yarn; the No. 99 machines which winds very large bobbins for certain kinds of knitted fabrics; No. 28 machine known as the "heavy three-way," used in connection with coarse yarn, taken from over the heads of spools; No. 13 multiple used in pre-

paring yarn for use in insulating wire; No. 90 machine used for winding filling bobbins; a "universal" creel is also made, being constructed to hold yarn wound on "Universal" cones. A copy of the catalog may be obtained by addressing the home office at Boston, Mass.

THE NATIONAL BRAKE & CLUTCH CO., BOSTON, MASS., makers of the well-known Cork Inserts have issued a sixteen page pamphlet covering reports on pulley tests made at the Worcester Polytechnic Institute, Worcester, Mass., and at the Lowell Textile School, Lowell, Mass. The different tests made by comparing pulleys with cork inserts, with plain steel, iron, and wood rim pulleys give very important information in regard to the efficiency of cork inserts. A summary of the results of the tests shows a 60 per cent. gain of the steel pulleys with cork inserts over said pulleys without the inserts; 51 per cent. gain of iron pulleys with cork inserts over same without inserts; 51 per cent. gain of wood rim pulleys with cork inserts over same without itself; 42 per cent. gain of wood rim pulleys with cork inserts over plain steel pulleys without inserts; 35 per cent. gain of wood rim pulleys over leather lagged pulleys without inserts. A copy of the report will be furnished upon application to the makers at Boston, Mass.

CAMERON MACHINE CO., BROOKLYN, N. Y., manufactures a variety of strip cutting machines suitable for all fabrics, so that any width of cloth can be handled and any width of strips or assortment of strips may be cut at one time. All of the strips are wound in neat compact rolls. Briefly stated the operation of the machine is as follows: (1) The cloth is drawn forward by rolls. (2) Knives are set in its path at any distance apart required. (3) The knives split the cloth. The knives may be of various styles, stationary, rotary, oscillating, etc., to answer the different requirements. (4) The strips are wound into rolls. The operations are all continuous. (5) One operator controls the process.

A catalog issued by this company illustrates the different style machines designated by B and H inclusive and gives the specific uses for which these different machines are adapted. This company is also agent for the folding machines built by Hacking & Co. Ltd., Bury, England. The first of these machines was made in 1840 and was patented in 1861, the machine having been continually improved up to its present efficient state.

THE J. A. GOWDEY REED & HARNESS MFG. CO., Providence, R. I., are erecting a factory building at No. 1226 North Main St., Providence, R. I., and will remove from their present building No. 40 Clifford St., which they have occupied for the past 48 years, on or about December 1st, 1909. The new building will be a one story and basement brick 79x45 feet, which will give them much increased factory space and enable them to supply the demand for their ever increasing patronage. Electric power will be used throughout.

THE FIRST MONTHLY MEETING for 1909-10 of the Technical Publicity Association was held on Thursday evening, October 14th in New York City. An informal dinner was enjoyed, and was followed by an interesting program. The president of the Association, Chas. S. Redfield, advertising manager of the Yale & Towne Mfg. Co., was toastmaster.

Howard M. Post, advertising manager of the Western Electric Co., outlined plans for the systematic and analytical study of effectually tracing results from trade paper advertising. The keying method, he said, had proved inadequate and there should be devised some way of determining the effect of such advertising. Mr. Post was made chairman of a committee to outline this study work for the Association.

The only extended address was that of George French, editor of Advertising & Selling, who gave a very interesting presentation of the psychological and artistic aspect of advertising. Mr. French took as his text a statement of Hugh Chalmers in a recent address at Louisville, Ky. Mr. Chalmers was referred to as "'The greatest salesman, perhaps the greatest advertiser in the country." The statement was "Every sale by any one anywhere is made in a man's mind—the mind of the one to become the purchaser." Continuing, Mr. French said "Advertising is profitable only when we consider this one thing. If I am to do anything, if I am to be effective, I have got to get the mind of the man I am to sell goods to."

Referring to the artistic aspect of the subject, the speaker stated that "The principles and fundamentals of art are a great help also to advertising. This is largely mechanical, largely psychological. In advertising it is of the first importance. You must think of your advertisement as a picture. The eye has to have something to attract it or the person can't be impressed. Certain elements or qualities go to make an advertisement attractive, some of which are, form, proportion, balance, harmony, tone, symmetry, perspective, and color."

EDWARD WEINGARTNER, president of the Arabol Mfg. Co., New York, whose products are a staple with many of our readers, has returned from a prolonged trip to Europe. His journey was a very successful one, combining recreation and pleasure, with a study of business and its methods in his line.

THE WESTERN ELECTRIC CO. announces that it is now in a position to furnish Sunbeam Tungsten Lamps in voltages between 200 and 250. These lamps are made in four sizes at present, namely, 45, 70, 112 and 180 watts. They are of the well known Sunbeam quality, and have given up to date equally as good satisfaction as Tungsten lamps of 110 volts range. Information and price may be obtained at the Western Electric Company's nearest branch house.

THE UNITED COTTON GIN CO. shipped in October to F. F. Putney, of Putney, Ga., a "Dise" gin of 16 discs. The present gin house contains six 70-saw gins. Mr. Putney will be glad to have any one interested investigate the gin while it is at work.

EUREKA FIRE HOSE MFG. CO. Geo. F. Hand, formerly connected with the Gutta Percha & Rubber Mfg. Company of Chicago, has succeeded Clay Baird as manager of the Chicago office of the Eureka Fire Hose Mfg. Co., 140 Dearborn St., Chicago.

C. A. POE, well-known in steam practice circles in Pittsburg, Pa., and adjacent territory, has disposed of his interests in that city and accepted a position with the Wright Co., and Austin Separator Co., of Detroit, Mich., in charge of the mechanical department, succeeding H. H. Humphrey, deceased.

THE ONEIDA STEEL PULLEY CO., Oneida, N. Y., recently established a record for prompt delivery of a large pulley. The Bay State Milling Co., of Winona, Minn., needed a pulley 10 feet in diameter with an 18-inch face to fit a 4 7-16-inch shaft. A cast iron pulley was out of the question, for every day's delay meant hundreds of dollars to the milling concern. So they got in communication with the Strong-Scott Mfg. Co., of Minneapolis, Minn., the

Oneida Steel Pulley Co's. agents for that territory who agreed to take the order and lay the pulley down within a week. The factory received the order on a Monday morning. The parts had to be stamped and assembled from the smallest brace to the huge rim. On the following Wednesday afternoon—three days later—the pulley was shipped. The gross shipping weight was 1,030 pounds. The pulley was shipped by express. It arrived at Winona Thursday. A cast iron pulley of the same dimensions would have weighed at least 4,000 pounds.

BUFFALO WOVEN LABEL WORKS, Buffalo, N. Y., manufactures woven labels in all sizes and colors to suit the requirements of manufacturers of different furnishings, such as clothing, shirts, shoes, waists, mackintoshes, underwear, knit goods, etc. These labels are woven in silk or cotton, as desired, the style of lettering being also selective to suit the different tastes of the customer. Samples of these labels will be forwarded upon application to the home office.

G. M. PARKS Co., Fitchburg, Mass., sole agent for the Turbo-Humidifier, has issued a handsome illustrated catalog describing this practical device for producing artificial humidity. The catalog goes carefully into the details of this invention of Albert W. Thompson, master mechanic of the Amoskeag Mfg. Co., describing in detail the underlying principles of the instrument as well as its construction. The latter part of the catalog is devoted to the subject of humidity in general and gives some very useful information which every cotton man should be acquainted with. A copy of the catalog will be mailed upon application to the agent at Fitchburg, Mass.

S. A. FELTON & SONS Co., Manchester, N. H., have issued an interesting catalog describing their full line of mill brushes and giving illustrations of the different styles used in the mills. Among the different types of brushes which this company manufactures are, revolving flat card brushes, cylinder comber brushes, comber dusters, grinder brushes, new style loom dusters, floor brushes, reed brushes, doctor brushes and print works furnishings. Superior Russian bristle or mixed bristles are used in practically all of these brushes. Catalog will be furnished upon application to the company.

SOUTHERN COTTON MILLS DIRECTORY, published by the "Textile Manufacturer" has been issued, giving in unique form information regarding all the mills in the South. Orders will be filled for this directory at this office upon receipt of the price of $1.00.

THE BUYERS' TEXTILE GUIDE. The initial issue of this quarterly paper was sent out in September. It marks a distinct departure in the publication of textile papers, and is unique in many ways. T. Oliver Dowd, for many years connected with the textile industry, is the publisher and editor. The paper contains many short articles, relating to textile and other affairs, most of which were prepared by the editor or selected with special reference to the paper. One of the unique features of the publication is, that it is of convenient size to fit into a coat pocket.

N. Y. LEATHER BELTING Co., New York City, has issued an interesting booklet entitled "From Forest to Factory," describing its Victor balata belting. This is the first complete data on the subject that takes up in detail the manufacture of Victor balata from the gathering of the balata gum in the jungle to the finished product. A limited number of these booklets are in the hands of the company in New York for distribution.

SEMI-ANNUAL REVIEW OF THE AMERICAN SILK TRADE, dated August, 1909, has been issued, according to the custom of the Silk Association of America. This review is presented for the information of all persons vitally interested in the semi-annual statistics which evidence a relation of the American market to the trade in raw materials and silk fabrics throughout the world in the silk season closed June 30. The last season's supply, and the outlook for the new season are also presented in the form of a table. The figures in the review represent the most accurate information obtainable.

THE WESTERN ELECTRIC Co., at New York and Chicago, is distributing a bulletin illustrating and exploiting the Sunbeam Tungsten Miniature lamp for use on voltages between 1½ and 20. The lamps vary in efficiency from .9 watts per candle-power to 1.33 watts per candle-power and are particularly desirable for use in automobiles, flash lights, signs, dental, optical and surgical instruments and in fact any place where battery or low voltage power circuit lamps are used. A copy of this bulletin No. 8-A may be obtained from the Western Electric Co.'s nearest house.

Contracts for mill buildings designed by Charles T. Main, mill engineer and architect, Boston, Mass., have been awarded as follows: New mill for the Franklin Felt Co., Franklin, Mass., to the Torrington Bldg. Co., of Torrington, Conn.; wool sorting building for the Abbot Worsted Co., Forge Village, Mass., to Edwards & Monahan, Boston, Mass.; Hockanum Mills Co., Rockville, Conn., office building and dye house, to Norcross Brothers Co., Worcester, Mass.; and S. Slater & Sons, Inc., Webster, Mass., boiler house, to Torrington Building Co., Torrington, Conn.

JOHN W. FRIES, New York City, maker of Hygrosso humidifiers, has been awarded the contract for a humidifying system at the Banna Mfg. Co., Goldville, S. C., which is now making improvements and additions to the plant whereby its capacity will be doubled. The installation at the above mill will consist of the belt-driven Hygrosso in all of the departments.

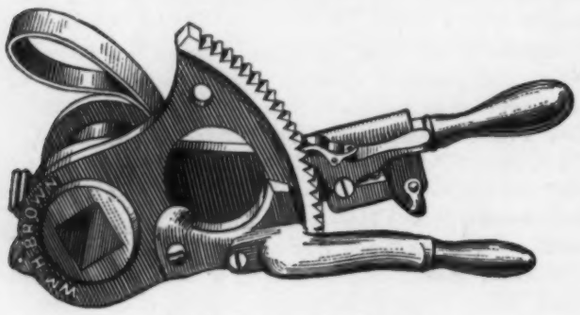
THE GEO. D. MAYO MACHINE Co., Laconia, N. H., gave their third annual outing at Lake Shore Park, on Saturday, Sept. 11, to their employees. Special electric cars were provided to take the party—350 in number—to Lakeport, where the steamer was boarded for the Park, and the morning hours were devoted to several events in the athletic line. A banquet was served at 12:30 o'clock, and was followed by a band concert and dancing in the pavilion, after which the steamer took the party for a trip among the islands, landing them at Lakeport about six o'clock. The company is at present very busy with orders for their "New Model A" knitter. To meet this demand the concern has recently made large additions to their shop equipment, and are now turning out 60 machines per week; in fact during the month of August, and before the new equipment was fully established, 223 machines were manufactured and shipped.

CASSELLA COLOR Co., New York City. The September issue of "Dyestuffs" contains a very interesting article on the dyeing of feathers, giving a complete explanation of the preliminary treatment of the feathers for the subsequent process of dyeing. Other subjects discussed in that issue are "The Dyeing of Upholstered Fabrics," "The Manufacture of Lakes," and "One Cause of Defective Dyeing."

H. A. METZ & Co., New York City, have issued a card

with cotton samples dyed with Helindone colors. These colors are remarkably fast to light, acids, chlorine, and other injurious influences. They are dyed in the hydrosulphite vat and can be used for cotton in any stage of manufacture, whether loose cotton, roving, yarn, or piece goods. They are also suitable for wool and silk. The fastness of these colors is one of their chief characteristics.

Wm. H. Brown Co., Worcester, Mass., manufacturer of carders tools, has issued an interesting catalog describing its product, one of the most important appliances being its latest improved card ratchet, as shown in the accompanying illustration. This ratchet is used in connection with clothing a card. By lifting on the small lever shown attached to the rack at the same time the lever carrying the ball is depressed, back lash or lost motion is prevented consequent on the loose sliding fit of the ratchet on the bar. The strap which is furnished with the ratchet is secured to the drum by a cam, thus affording the best of facilities for adjustment. The rack is made of large



Improved Card Ratchet.

radius to allow the teeth to be made coarser and stronger, while by use of a duplex pawl it is made equivalent to a pawl of one-half the pitch, thereby securing a fine adjustment of the strain on the card clothing. Besides the necessity of using but little more than one-fourth the circle for the rack, the drum can be placed closer to the cylinder of the card when in use. The device is made for a sliding fit on a 1½ inch square iron bar.

Draper Co., Hopedale, Mass., in its August issue of "Cotton Chats" discusses in a very interesting manner the subject of "Shortage of Help" and points to the fact that by the time the great number of new mills and the enlargements of the present mills are completed, there will be serious trouble in obtaining the thousands additional cotton mill operatives required. Under such conditions machines that require the least training of help are of great advantage independent of other conditions. It has been found that in the cotton manufacturing cities, many of the operatives can speak but little if any English. Owing to the different mechanical attachments to the Northrop looms it can be more easily run by newly arrived immigrants or other inexperienced help, than other looms which depend entirely upon individual skill for the best results.

Extracts from the address of Arthur H. Hamilton delivered at the last meeting of the Southern Textile Association at Spartanburg, S. C., are also given. The subject of this address was "Automatic vs. Plain Looms," and gave a very interesting description, pointing to the fact that the first installation of the Northrop loom was made in the South.

Arguto Oilless Bearing Co., Philadelphia, Pa., has issued an attractive folder under the caption of a "Constant Cry," the cry being for more production. The use of the oilless bearings is to save the amount of lubricant required, the cost for oiling, and time consumed in repairing and replacing worn and damaged journals.

Manufacturers who still use tallow as a softener will obtain superior results by using the Soluble Softening Oil made by the Arabol Mfg. Co., 100 William St., N. Y. City. It gives a smooth finish to the warps, makes the threads part easily in the lease rods, and leaves the slasher cylinders clean and bright. It remains in sweet condition all the year around, and is uniform and pliable, in summer and winter. It is neutral and easily handled.

Steam Turbines have been successfully introduced in practically all lines of industry, and textile mills were among the first to recognize in them a standard and thoroughly reliable type of prime mover. In New England alone, known everywhere for its many mills, the Allis-Chalmers Co. has sold 38 steam turbines aggregating in total capacity 51,000 horse-power. The power-house of the new Nashawena Mills in New Bedford, will contain two 3000 k. w. and one 500 k. w. of their steam turbines. Allis-Chalmers Co. has also contracted with the Whitman Mills, at New Bedford, for power-house equipment including a 2000 k. w. steam turbine, and with the Byron-Weston Co., of Dalton, Mass. for one 750 k. w. steam turbine. The Allis-Chalmers steam turbine is of the horizontal re-action, full annular flow type.

Western Electric Co., New York City. Returns for August show that the business of that month ran 60 per cent. ahead of the business for August, 1908, also showing a gain of about 5 per cent. over July. At the rate of the August increase, the business for the current year will run in excess of $53,000,000, representing as it does a gain of $14,000,000 over the total gross sales of 1907-8 of approximately $33,000,000. In the United States there are about 16,000 independent telephone companies, of the "outside operating companies," 6,000 or 37½ per cent. are customers of the Western Electric Co. The company's business with the Bell companies is quoted as showing a satisfactory rate of increase.

Jos. Dixon Crucible Co., Jersey City, N. J. The September issue of "Graphite" contains several articles of interest, and serves admirably the purpose of emphasizing the different uses of graphite, in a number of well selected articles.

Detroit Graphite Co., Detroit, Mich., manufacturers of paint, has just issued a booklet entitled "Frigid Facts" which any one contemplating house painting should have in his possession. A copy of this little booklet will be mailed upon request.

Otis Elevator Co., New York City. The August issue of the "Indicator" gives descriptions of installations in the Commercial National Bank Building, Chicago, Ill., W. P. Story Building at Los Angeles, Cal., and the Phelan Building at San Francisco. Different types of electric elevators are described at length as well as an article on "Wedge Clamp Safeties."

The Lucas Pump Co., Dayton, Ohio, advise that on account of the resignation of R. E. DeWeese as the treasurer of the Lucas Pump Co., John W. Good has been elected to fill the vacancy for the unexpired term. R. E. DeWeese is taking a trip abroad. John W. Good is a prominent and well-known business man of Dayton.

MILL NEWS.

Notices of mill projects, additions or improvements are solicited for this department.

Alabama.

ANNISTON. The Anniston Yarn Mill will erect a one-story 75x160 ft. building next spring and will add 3,000 spindles. Present equipment, 5,700 spindles.

Arkansas

FORT SMITH. Great Southern Cotton Mills is the name of a new company being organized by W. H. Talmadge and C. S. Lowery.

PINE BLUFF. It is reported that a party of Memphis capitalists will establish a large cotton mill in this city in the near future. The Board of Trade has assured the promoters that a site for the mill will be given free of charge.

Connecticut.

GROTON. The Royal Linen Mills Co. has been incorporated with a capital stock of $400,000 by Geo. C. Patton, Ralph Tadmore, of New York, and Henry M. Pike, of Mystic, Conn.

JEWETT CITY. Ashland Cotton Co. has awarded a contract for the construction of additional building 100x200 ft. two stories high.

Georgia.

CANTON. Canton Cotton Mills, according to report, will build an addition to its present plant and add 10,000 spindles and 300 looms, electric generator, etc.

CHATTAHOOCHEE. The Whittier Mills Co., with a present equipment of 10,000 ring spindles, 100 braiders, etc., will add 5,000 spindles and the necessary preparatory machinery.

COLUMBUS. The Chattahoochee Power Co. is the name of a new concern applying for a charter, with a capital stock of $100,000, with the privilege of increasing to $2,000,000, the incorporators being B. H. Hardaway, Geo. A. Pearce, E. J. Rankin, and others. This company will develop 4,000 H. P. The total cost of building the dam, power house, and transmission line will be $40,000.

COVINGTON. D. A. Tompkins, C. G. Smith, T. G. Callaway, J. E. Phillips, and others of this city will, according to report, organize a company with a capital stock of $100,000 to build a cotton mill.

DOUGLASVILLE. John C. Duncan is planning the organization of a company to erect a cotton mill.

FORT VALLEY. The Fort Valley Yarn & Hosiery Mill with a present equipment of 1,400 spindles will, it is reported, increase its equipment in the near future.

SUMMERVILLE. The Summerville Cotton Mills, according to report, will increase their capital stock from $150,000 to $185,000 and will use the funds for additional equipment to be added to its present 5,000 ring spindles and 120 looms.

Massachusetts.

EAST BOSTON. Maverick Mills have awarded the contract for the construction of the weave shed, the latter to be entirely of reinforced concrete. It is thought that this department of the new mill will be in operation in about four months.

EASTHAMPTON. The Glendale Elastic & Fabric Co. will enlarge its finishing and shipping departments by the erection of a three-story, 30x40 ft. addition. Contract has been awarded.

EAST WAREHAM. Contract has been awarded for the construction of the new cloth finishing and bleaching plant to be erected by John W. Knowles and Eugene S. Graves. The main building will be 282x103 feet, two stories, and an extension in the rear of 181x77 feet, one story high. The cost of the new plant will be about $150,000 and the company will be known as the New Bedford and Agawan Finishing Co.

FALL RIVER. The Merchants Mfg. Co., it is reported, is considering plans for adding to its equipment. They expect to increase their capacity to 150,000. The present equipment is 135,000 spindles.

LAWRENCE. Arlington Mills. Work has begun on the foundation of the addition to the cotton department of this mill, which will be used for winding, quilling, warping, and finishing of cotton yarns. The addition will be 140x100 feet, four stories high, to cost $150,000, including the equipment. The contract was awarded to B. F. Smith Co., Pawtucket, R. I.

LAWRENCE. Wood Mills. The foundation is being laid for the section F of this new mill, and the work on section E is being pushed rapidly, and will probably be finished by the first of December. The length of the sections A, B, and C will be 1,437 feet, while sections D, E, and F will be 1,500 feet.

METHUEN. Atlas Mfg. Co. has been incorporated with a capital stock of $50,000 to manufacture and sell all kinds of yarns, cotton, and woolen goods. Levi W. Taylor, Pres.; Howard L. Gordon, of North Salem, N. H., Treas., and Chas. L. Poor, of Haverhill, Mass., Sec.

MANSFIELD. The Mansfield Bleachery has been incorporated with a capital stock of $100,000 by C. L. Croteau and A. F. Jones, to finish textile fabrics.

WORTHINGTON. S. Slater & Sons, it is reported, will have a re-capitalization of the corporation and $2,000,000 of twenty year bonds and $2,500,000 of preferred stock are to be issued and the plant of the Moore Spinning Co., at North Chelmsford, Mass., is to be acquired.

New York.

BRIAR CLIFF. The Cotton Exploration Co. has been incorporated with a capital stock of $10,000 to manufacture and sell cotton fabrics. The incorporators are N. B. Chadsey, Arthur J. Genaham, and H. L. Guncher.

BROOKLYN. The Kings County Dye Works have been incorporated with a capital stock of $5,000, the incorporators being Benj. F., Meyer, and Max Wigdor of Brooklyn.

BUFFALO. The Buffalo Weaving and Belting Co. has broken ground for the erection of a one-story brick building to cost $10,000. It will be equipped with the latest machinery for weaving and will employ 100 hands.

THERESA. The Theresa Silk Co. has been incorporated with a capital stock of $50,000 to manufacture silk and cotton goods. The incorporators are Jas. Moore, Eliza Moore, and Jas. J. Phelan.

UTICA. The Utica Fine Yarns Co. has been incorporated with a capital stock of $225,000 by W. B. Foster, W. H. Roberts and G. L. Wood, to manufacture yarns, fabrics, cloths, etc.

North Carolina.

BESSEMER CITY. Whitestone Cotton Mills have awarded contract for an additional building 60x100 feet, in which spindles will be installed.

CANTON. D. J. Carpenter, of Newton, N. C., and associates have formed a company with a capital stock of $50,000 to erect a hosiery knitting mill.

CONCORD. The Magnolia Mills Co. will build a 50x70 foot addition and install new machinery, its present equipment being 1,800 spindles.

DURHAM. Erwin Cotton Mills have purchased a Curtis steam turbine with a capacity of 2,200 H. P. An electric generator will be connected for supplying electricity to the mill.

GRAHAM. The River Falls Cotton Mills Co. has been incorporated by J. W. Menefee and associates, with a capital stock of $200,000, to build a cotton mill to be operated by water power from the Haw River. J. W. Menefee, Pres.; J. D. Kernodel, Vice-Pres.; R. N. Crook, Sec.

GRAHAM. The Graham Hosiery Mills Co. has been incorporated with $25,000 capital stock by W. S. Blackburn, A. M. Hadley, and Chas. C. Thompson.

JAMESTOWN. The Oakdale Cotton Mill will double its present capacity of 5,344 spindles for the manufacture of twine, and for this purpose will build an addition 103x200 feet.

LUMBERTON. The National Cotton Mills have just declared a quarterly dividend of 3 per cent.

PENROSE. Penrose Mfg. Co. has been organized with M. L. Towery President. Contract has been awarded for the initial installation of 100 hosiery knitting machines. This company plans to install spindles later to produce yarns for its knitting department. The capital stock is $120,000.

RALEIGH. The Chamber of Commerce is interested in a movement to secure the establishing of a hosiery, dyeing, and finishing plant in this city.

ROCKY MOUNT. The Rocky Mount Mfg. & Mercantile Co. has been incorporated by A. A. Richardson, Robt. Plummer and others with a capital stock of $50,000.

TARBORO. The Runnymede Mill No. 3 has ordered 100 knitting machines, 20 loopers, ribbers and other necessary machinery. George Howard, Pres.; C. W. Jeffries, Gen. Mgr.

THOMASVILLE. The Amazon Cotton Mills Co., it is reported, will be incorporated to build a cotton mill by J. W. Cannon and J. F. Cannon, of Concord, N. C., and Chas. D. Hill, of Winston-Salem, N. C.

WADESBORO. C. M. Burns, J. D. Horne of Wadesboro, and Robt. L. Steele of Rockingham, N. C. plan the organization of a company to build a cotton mill, the capital to be $300,000.

WHITEVILLE. W. H. Crowell is reported to be interested in a plan to organize a company to build a cotton mill. Capital stock to be $250,000.

WILSON. The Wilson Cotton Mills, it is reported, will change over from coarse to fine yarn production, and will install the necessary additional machinery. Present equipment, 6,234 spindles.

WINSTON-SALEM. A big cotton factory at Walnut Cove is the plan of capitalists in this city. Cottages for the operatives are now in course of constrcution.

Oregon.

PORTLAND. Multnomah Mohair Mill has been incorporated with a capital stock of $150,000 to manufacture mohair linings

Pennsylvania.

CHESTER. Aberfoyle Mfg. Co. has renovated the Lewis Mill, located directly across the street, and has had a bridge constructed to connect the two mills. New machinery will be installed in the Lewis Mill.

CHESTER. The Lincoln Mfg. Co., which was in the hands of a receiver, has been sold to Jos. H. Parvin, of Philadelphia, Pa., for $87,000, which includes a mortgage of $20,000. The plant is fully equipped with cotton spinning machinery, consisting of 12,000 spindles, combers, etc. It is stated that additional machinery will be installed.

READING. Eclipse Underwear Mills' plant has been purchased by S. D. Bausher, proprietor of the Gotham Underwear Knitting Mills Nos. 1 and 2, of Hamburg, Pa., and the machinery will be moved to Williamstown, Pa.

Rhode Island.

OLNEYVILLE. U. S. Dress Goods Co. has purchased a mill site in this city and plans are being drawn for the building. The incorporators are Fred. D. Manley, Robt. Young and Allison Stone. Four thousand spindles will be installed, although it is planned to eventually make dress goods.

WOONSOCKET. Caderas & Ozanne, of Calais, France, have leased the plant of the Jas. Brown Machine Co. and will remove their business to this city in a short time. The French concern manufactures laces and will employ about 500 hands.

South Carolina.

GREAT FALLS. Republic Cotton Mills have been incorporated with a capital stock of $600,000, and organized with Robert S. Mebane of Greensboro, N. C., Pres.; Thomas S. Fuller of Durham, N. C., Vice-Pres., and Hal B. Mebane of Greensboro, N. C., Sec.-Treas. Spinning mill will be a two-story 132x400 feet building, and the weave shed will be one story 132x400 feet. Equipment will be 25,000 spindles and 1,000 automatic looms for making a fine grade of cotton goods. Plant will be operated by electricity. J. E. Sirrine, Greenville, S. C., is the architect.

LOWNDESVILLE. A movement is on foot among prominent business men of this city to establish a cotton mill.

ORANGEBURG. Orangeburg Cotton Mill has completed the installation of its additional 1,500 spindles and now has in operation 16,500 spindles.

WESTMINSTER. The Oconee Mills Co. will add 3,000 spindles to its present equipment of 10,270 spindles and 362 looms.

WINNSBORO. The Fairfield Cotton Mills closed down about the middle of October for extensive repairs which will be made to the plant, including the installation of a new engine and boiler. Operations will not be resumed for some months.

Tennessee.

LOUDON. The Loudon Hosiery Mill has awarded contract for a one-story addition and a two-story building to provide space for additional machinery. Present equipment, 108 knitting machines.

NASHVILLE. Nashville Hosiery Mills, it is reported, will be incorporated to take over the local plant heretofore operated by the National Hosiery & Yarn Co. The equipment is 300 knitting machines, with a daily output of 1,200 dozen pairs of children's ribbed hosiery. J. H. McPhail and associates are interested.

NASHVILLE. Warioto Cotton Mill will increase its equipment from 20,000 ring spindles to 25,000 spindles and 540 looms to 675. Contracts have been awarded for the additional machinery.

OBION. Mayor Wilson of this city is in receipt of a communication from parties seeking information in regard to the establishment of a cotton mill.

WINCHESTER. The Daisy Hosiery Mill of East Chattanooga will soon award contract for the erection of a building 40x120 feet with an ell 24x40 feet to cost about $8,000. Huntingdon & Still, Chattanooga, Tenn., are the architects in charge.

Texas.

GONZALES. Gonzales Cotton Mills Co., which has been in operation for some time, has just been incorporated with a capital stock of $100,000. Two thousand, two hundred spindles and 50 looms will be added to the present equipment of 5,000 spindles and 100 looms. G. F. Harwood, Pres.

ITASCA. The Itasca Cotton Mills have declared their semi-annual dividend of 4 per cent. payable on November 1st.

SHERMAN. The Sherman Mfg. Co. is making a good many improvements to its plant. A quantity of new machinery has been added, and a large steel tank is being erected which will be 125 feet from the ground.

TEMPLE. The Temple Commercial Club is reported as considering the establishment of a hosiery knitting mill.

Virginia.

PORTSMOUTH. Parker Hosiery Mill and Dye Works has been incorporated with a capital stock of $50,000 and will continue the operation of the plant. Jos. A. Parker, Pres.; H. A. V. Parker, Sec.-Treas.

SUFFOLK. The Bell Hosiery Mills have been incorporated with a capital stock of $10,000. R. H. Rawles, Pres.; J. H. Mitchell, Vice-Pres.; A. A. Woolford, Sec.

VIRGILINA. The Virgilina Hosiery Mill reported last month as organized with P. H. Fontaine, Pres., W. M. Pannebaker, Vice-Pres., S. M. Torian, Treas., and A. L. G. Stevenson, Sec., has purchased a two-story building to be equipped with 30 knitting machines, loopers, press, etc., for the manufacture of men's half hose.

Wisconsin.

MARIANETTE. The Marianette Knitting Mill Co. will build a two-story addition which when equipped will double the present output.

Personal.

H. M. Abernathy, from Lenoir, N. C., is now an overseer at the York Cotton Mills, Yorkville, S. C.

W. M. Abernathy, from Charlotte, N. C., is now card grinder at the Belle Vue Mills, Hillsboro, N. C.

J. T. Alexander, from Albemarle, N. C., has gone to Rockwell, N. C., to assist in the starting up of the Barringer Mfg. Co. of that place.

L. E. Bagwell, of Spartanburg, S. C., is now holding the position of engineer and machinist at the Siluria Cotton Mills, Siluria, Ala.

G. A. H. Barnhardt has returned to Cochran, Ga., to become overseer of weaving after putting on 50 dobby heads for Siluria Cotton Mill, Siluria, Ala.

H. W. Bost has accepted a position as master mechanic at Rockwell, N. C., in the new Barringer Mill.

Richard Bost has become overseer of carding at the new Barringer Mill which is just beginning operation at Rockwell, N. C.

Mr. Bradley will be the new superintendent of the Peck Mfg. Co., Warrenton, N. C.

J. F. Brandon, from the Ottaray Mills, Union, S. C., is now overseer of the picker room at Lockhart, S. C.

D. O. Bryant has resigned as overseer of spinning with the Wahoo Mfg. Co., Sargent, Ga.

M. L. Bryant, from Darlington, S. C., has accepted the position of overseer of carding in the new Waverly Cotton Mills, Laurinburg, N. C.

John Byard, from Pelham, Ga., has succeeded D. L. Hamrick as second hand in carding in the Moultrie (Ga.) Cotton Mills.

J. E. Carter has succeeded E. L. Thompson as overseer of weaving at the Eno Cotton Mills, Hillsboro, N. C.

W. E. Cheswell, formerly president and manager of the Cheswell Mfg. Co., Westminster, S. C., has assumed the superintendency of the Courtney Mfg. Co., Newry, S. C.

I. F. Clonts, who has been in charge of the roller covering shop at the Kesler Mill, Salisbury, N. C., has accepted the position of foreman of the shops of the Charlotte Supply Co., Charlotte, N. C.

J. H. Clough, formerly second hand in twisting, slashing and warping with the Paola Mills, Statesville, N. C., is now with Walterboro Cotton Mill, Walterboro, N. C.

C. R. Costner has been promoted from second hand to overseer of carding in room No. 1 of the Columbia Duck Mills, New Brookland, S. C., succeeding W. T. Hemrick, resigned.

Walter Crump has resigned the superintendency of the Grace Cotton Mills, Salisbury, N. C., to become instructor at the Mississippi Textile School.

J. T. Dabbs, from the Dresden Mills, Fayetteville, N. C., has become overseer of spinning, spooling, twisting, reeling, and warping at Hamer, S. C.

John A. Davis, who was for several years overseer of weaving at McComb City, Miss., after an absence of five years has returned to that position.

H. Lee Dearman has accepted the position of overseer of spinning with the Commonwealth Mills, Durham, N. C.

Mr. Downing has resigned as overseer of spinning at Steele's Mills, Cordova, N. C., to accept a similar position at one of the mills at McColl, S. C.

W. B. Ellington has resigned as loom fixer at Summerville, Ga., to accept a similar position at Canton, Ga.

W. E. Farrington, from Spray, N. C., has succeeded H. B. McAbee as superintendent of the mill at Elizabeth City, N. C.

R. A. Fitch has resigned the position of superintendent of Tarboro Cotton Mill, Tarboro, N. C., and is succeeded by his brother, Sam Fitch, who was promoted from overseer of weaving.

H. F. Gaddy succeeds W. P. Smith as overseer of carding with the Wahoo Mfg. Co., Sargent, Ga.

John H. Gardner, from the Payne Mill, Macon, Ga., has accepted the position of overseer of spinning at the Bibb Mfg. Co., Columbus, Ga.

W. A. Gaskin, from Emporia, Va., has become second hand in twisting and winding at the Linn Mill, Landis, N. C.

E. H. Gray has resigned his position as engineer of the Drayton Cotton Mills, Spartanburg, S. C., and removed to Peachland, N. C.

James Gregory, from the Monarch Cotton Mills, Union, S. C., has accepted a position as loom fixer in the Union Cotton Mills, same city.

B. P. Howe, recently of Winnsboro, S. C., has accepted a posi-

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PAWTUCKET, R. I.

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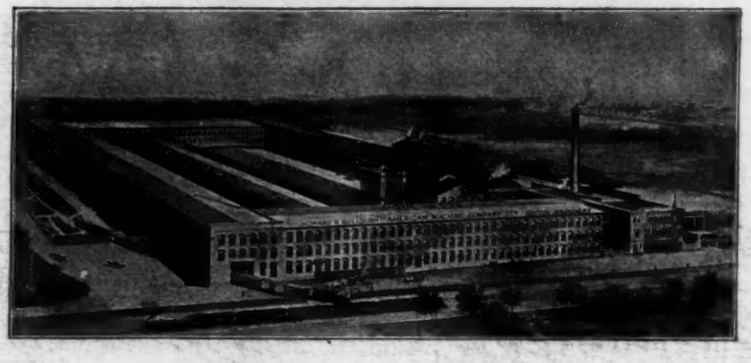
Atlanta, Ga.

COTTON MACHINERY



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WE INVITE YOUR INVESTIGATION AND COMPARISON.

tion as overseer of spinning at the Springstein Mill, Chester, S. C.

W. D. Hudson, from Henderson, N. C., has become overseer of carding and spinning at the Victory Mills, Fayetteville, N. C.

J. W. Ingle has accepted the position of overseer of card room No. 2, New Brookland, S. C.

A. B. Ingram has resigned as loom fixer at the Union Cotton Mills, Union, S. C., to accept a similar position with the Whitney Mfg. Co., Whitney, S. C.

John H. Johnson, from the Bibb Mill, Columbus, Ga., is now overseer of spinning at the Hamburger Mills, same place.

S. A. Jones has been promoted from second hand in mills No. 1 and 2, McColl, S. C., to overseer spinning and winding in mill No. 3, at same place, succeeding Mr. Bullock, who now has the spinning at Bennettsville, S. C.

D. E. Kennedy, from King's Mountain, N. C., is now second hand in spinning at Whitney, S. C.

L. W. King, from the Brown Mfg. Co., Concord, N. C., has accepted the position of carder and spinner in the Cowikee Mill, at Eufaula, Ala.

L. E. Kiser, formerly overseer of weaving at the Springstein Mills, Chester, S. C., is now connected with the Brogon Mills, Anderson, S. C.

Geo. A. Lamb, who has been holding a position as one of the overseers at Randleman, N. C., has resigned.

R. Ledbetter, from Augusta, Ga., has accepted a position as card grinder at Langley, S. C.

Torrence LeGrand has resigned as superintendent of the Hanover Mills, Concord, N. C., to accept the superintendency of the Palmetto, Ga., Cotton Mills.

Will McCombs has resigned as overseer of spinning and assistant superintendent of the Scotland Cotton Mills, Laurinburg, N. C., to become overseer of carding and spinning at the Waverly Mills, same city.

John McDaniel has resigned as second hand in the weave room of the Brookford Mills, Hickory, N. C., to become head loom fixer on fancy work at the same mill.

W. A. McVicker, formerly second hand in the winding department, now has charge at night of spinning, spooling and warping in Highland Park Mill No. 3, of Charlotte, N. C.

D. E. Madden, who lately resigned as overseer of the cloth room at the Hermitage Cotton Mill, Camden, S. C., has accepted a similar position with the Hartsville, S. C., Cotton Mill.

W. B. Miller has accepted a position as loom fixer in the Loray Mill, Gastonia, N. C.

S. W. Mimms has resigned as superintendent of the Capital City Mills, Columbia, S. C., and will devote all of his time to the Richland Mills, same city.

M. W. Moore, who has been fixer in the Hoskins Mill, Charlotte, N. C., has accepted a position with the Savona Mfg. Co., same city, on Jacquard work.

W. B. Morgan, from the Manetta Mills, Lando, S. C., has accepted the position of boss weaver at the Ossipee Mill, Elon College, N. C.

J. L. Morrow has resigned his position in the machine shops of the Lancaster, S. C., Cotton Mills, to accept a similar place at Lando, S. C.

Mack Morton has resigned as card grinder at mill No. 2, Mooresville, N. C., and has accepted a similar position with the Mecklenburg Mfg. Co., Charlotte, N. C.

Thos. R. Morton, recently of the Fulton Bag and Cotton Mills, Atlanta, Ga., has accepted the position of overseer of spinning, spooling and warping at the Poulan, Ga., Cotton Mill.

Ira Newsome has been promoted to overseer of weaving at the Union Mills, Lafayette, Ga.

Frank Odell has succeeded P. Bunton as second hand in the weave room at Ware Shoals, S. C., who goes to Belton, S. C.

T. J. Payton, of Monroe, Ga., has accepted a position as second hand in the card room of the Monroe Cotton Mill, of that place.

H. N. Penny, from Charlotte, N. C., has become master mechanic of the Transylvania Cotton Mill, at Brevard, N. C.

Gus Phillips, who has for nearly twenty-five years been employed in the Hope Mills (N. C.) Mfg. Co., in the capacity of a dyer, has resigned.

D. F. Poole has accepted a position as overseer of weaving at the Victory Mfg. Co., Fayetteville, N. C.

H. H. Poole has resigned as overseer of carding at the Pacolet Mill, No. 3, and is now located in Spartanburg, S. C.

R. L. Pope, from the Manchester Mill, of Macon, Ga., is now second hand in carding with the Lowe Mfg. Co., Huntsville, Ala.

J. D. Ray, from Rockingham, N. C., has taken charge of the steam plant of the Wadesboro, N. C., Cotton Mills.

T. B. Rector has been put in charge of the dye plant in addition to his duties as overseer cloth room, supply and shipping at Siluria, Ala.

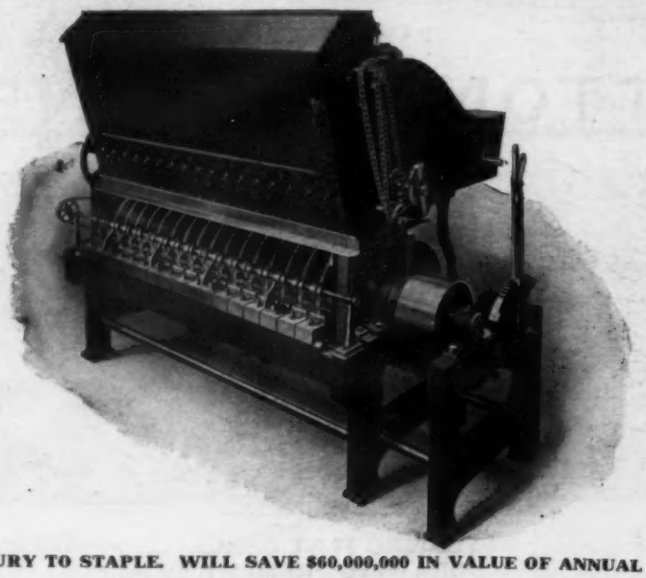
T. B. Richards, from Cooleemee, N. C. has accepted a position as master mechanic with the Cleveland Mill and Power Co., Shelby, N. C.

(Continued on page 92.)

....THE "DISC" GIN....

IS RUNNING AT F. F. PUTNEY'S GINNERY, PUTNEY, GEORGIA, RAILROAD STATION HARDAWAY, GEORGIA.

Cotton Ginners AND Planters ARE Cordially Invited TO VISIT PUTNEY



AND Inspect THE "DISC" GIN IN Operation DURING November AND December 1909

NO INJURY TO STAPLE. WILL SAVE $60,000,000 IN VALUE OF ANNUAL CROP.

FOR FURTHER DETAILED INFORMATION WRITE

THE UNITED COTTON GIN CO.,

184 Summer Street, BOSTON, MASS.

OFFICERS:

L. L. TOWER, President, Boston, Mass.
For 30 years President, Cutter Tower Co., Boston, Mass., and Tower Mfg. & Novelty Co., New York.

W. H. BLISS, Secy. & Treas., Boston, Mass.
For 20 years Treas. Cutter Tower Co., Boston, Mass.

THEOPHILUS KING, Vice-Pres., Quincy, Mass.
Banker and Manufacturer.

E. R. BULLOCK, M. E., Boston, Mass.
Formerly with J. & P. Coates, Ltd.

J. R. Roberts has become overseer of spinning at the Cora Mill, Kings Mountain, N. C.

G. M. Robinson, formerly of Ninety Six, S. C., is now overseer of the cloth room at the Glenwood Mills, Easley, S. C.

C. E. Rodgers, from Hillsboro, N. C., is now second hand in carding at the Golden Belt Mfg. Co., Durham, N. C.

Otto Seiferth has resigned as overseer of spooling, warping, slashing, dressing and winding for the Bibb Mfg. Co., Columbus, Ga.

John E. Shaw has been promoted from overseer of weaving to superintendent of the Steele Mills, Rockingham, N. C., succeeding S. W. Steele, resigned.

John Smith, who has been loom fixer at one of the mills in Danville, Va., is now second hand in weaving at the Edna Mills, Reidsville, N. C.

Thomas Smith has succeeded William Pitts as second hand in spinning with the Wahoo Mfg. Co., Sargent, Ga.

W. P. Smith has resigned as overseer of carding with the Wahoo Mfg. Co., Sargent, Ga., and is now connected with the Ide Mills, Jacksonville, Ala.

E. P. Taft has become superintendent of the Capital City Mills, Columbia, S. C.

Geo. K. Tate, who recently resigned as superintendent of the Lockmore Mills, at Yorkville, S. C., has accepted the superintendency of the Hannah-Pickett Mills, Rockingham, N. C.

E. L. Thompson, from the Eno Cotton Mill at Hillsboro, N. C., has been employed as superintendent of the Ossipee Mills, at Elon College, N. C.

G. H. Tippett and J. M. Berry now have charge of the weaving in mill No. 4 at Pelzer, S. C., succeeding T. C. Snipes, who had charge of both rooms.

T. C. Trull has resigned his position in Belmont, N. C., to accept a position as card grinder in one of the mills at Gastonia, N. C.

Jas. A. Walker has resigned as superintendent of the Glen Raven Cotton Mills, of Burlington, N. C.

F. J. Ward has accepted a position with the Fidelity Mfg. Co., of Charlotte, N. C., as night overseer of carding.

F. M. Ward will become overseer of carding and spinning at the Huss Mfg. Co., Bessemer City, N. C.

Wesley West, from Knoxville, Tenn., has accepted a position as second hand in carding in the Anchor Duck Mills, of Rome, Ga.

A. R. Williams has accepted a position as second hand in weaving with the Minneola Mfg. Co., Gibsonville, N. C.

W. N. Wilson, formerly overseer carding, spinning and slashing at the Mary-Lelia Mills, of Greensboro, Ga., has become overseer of spinning in one of the mills at Lafayette, Ga.

I. Walker Wright has been made superintendent of the Calumet Mfg. Co., Liberty, S. C.

J. H. Gardner, formerly of the Payne Mill, Macon, Ga., is now overseer of spinning at the Bibb Mfg. Co., Columbus, Ga.

Peter Keller, formerly superintendent of the Cora Mills, Kings Mountain, N. C., is now superintendent of the Dowell Mfg. Co., of Concord, N. C.

John Shaw, formerly overseer of weaving at Steele's Mills, has been promoted to the superintendency of the same mill.

R. T. Le Grande, formerly superintendent of the Hanover Mfg. Co., Concord, N. C., has been made superintendent of the Palmetto Cotton Mills, Palmetto, Ga.

J. A. Fowler, formerly superintendent of the Ossipee Mills, Elon College, N. C., has been made superintendent of the Bellwill Mill, Wilmington, N. C.

Alfred N. Landau, formerly superintendent of the Lane-Maginnis Mills, New Orleans, La., is now associated with A. H. Washburn, Charlotte, N. C.

W. L. Carter, of North Carolina, has been made superintendent of the Athens Mfg. Co., Athens, Ga.

Thos. E. Heatley, formerly designer at the Borden Mills, Fall River, Mass., has been appointed superintendent of the Taber Mills, New Bedford, Mass.

Moses Shuttleworth, formerly assistant agent at the Washington Mills, Lawrence, Mass., succeeds the late James Ingram as agent of the mill. Robt. G. Todd, formerly superintendent of the dyeing department, has been made assistant agent, and Helian Garth, formerly overseer of spinning, has been made superintendent of the worsted department.

Gilbert Broome, of Fall River, Mass., has become superintendent of the New York Mills, New York Mills, N. Y.

Pardon B. Sanford is now connected with the Utica (N. Y.) Fine Yarn Co.

Earle K. Atwood, formerly overseer of carding and combing of the Lawrnec Mfg. Co., Lowell, Mass., has been appointed agent of the Lockwood Co., Waterville, Me.

W. G. Weeks, from Langley, S. C., has accepted a position at Edgefield, S. C., to overhaul the spinning and put in new frames in the reorganized Beaver Dam Mills.

Sims Wylie has resigned as secretary of the Wymojo Mills, of Rock Hill, S. C.